Price $7.50

SHURE®

AMS4000 AND AMS8000

AUTOMATIC MICROPHONE SYSTEM

SERVICE MANUAL

ISSUE NO. 2

Manufactured by
SHURE BROTHERS INC.
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Evanston, Illinois 60202-3696

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U.S. Patent 4,489,442

SPECIFICATIONS

Output Level (at full gain, 1 kHz, one channel gated On, Off-Atten at −15, with AMS26 probe microphone, output terminations: Line 600Ω, Mic 150Ω, Aux 50k, Direct 50k, Phones 200Ω)

INPUT	OUTPUT					Input Clipping Level at 1 kHz
	Line	Mic	Aux	Direct	Phones	
Microphone Input Sensitivity (72 dB SPL in.)	+15.8 dBV (+18 dBm)	−34 dBV	+17 dBV	−56 dBV	−4 dBV	128 dB SPL
Aux Input Sensitivity (−22 dBV in.)	+15.8 dBV	−34 dBV	+17 dBV	−−	−4 dBV	+7 to +20 dBV*

*Depending on Aux control setting.

Frequency Response
Aux Input to Outputs: 30 to 20,000 Hz, ±2 dB
Mic In to Outputs: 70 to 20,000 Hz, ±2 dB (controlled low-frequency rolloff below 50 Hz)

Aux Input Impedance
70k or greater, unbalanced (designed for use with less than 10k source impedance)

Outputs

OUTPUT	IMPEDANCE		Output Clipping Level
	Designed for Use With	Actual (Internal)	
Mic	150Ω balanced lines	1Ω	−34 dBV
Line	600Ω balanced lines	150Ω	+15.8 dBV (+18 dBm)
Aux	10k or greater	2.2k	+17 dBV
Direct	10-50k unbalanced mic circuit	1k	0 dBV
Phones	200Ω	2.2k to tip, 2.2k to ring	−4 dBV

Hum and Noise
Equivalent Input Noise: 27 dB SPL, A-weighted, with AMS26 probe microphone

Output Noise: −62 dBV (master up), −88 dBV (master down) (300-20,000 Hz, input controls down, Off-Atten at −15)

Output Hum and Noise: −58 dBV (master up), −82 dBV (master down) (20-20,000 Hz, input controls down, Off-Atten at −15)

Distortion
THD 0.35% or less, 30 to 20,000 Hz at +15 dBm output; IMD 0.5% or less up to +15 dBm output

Phase
Positive pressure on AMS microphone diaphragm produces positive voltage on pin 2 of Line/Mic balanced output with respect to pin 3, tip of Aux output, and tip and ring of Headphones output, and negative voltage on tip of Direct output. Aux output is in phase with Aux input.

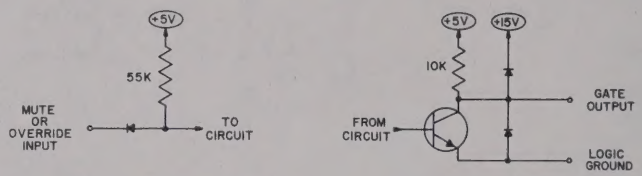
Gating
Attack Time: 4 msec
Hold Time: 0.5 or 1.0 sec (switchable)
Decay Time: 0.3 sec after Hold interval

Off-Attenuation
Fixed: −15 dB
Variable: −∞ to −8.5 dB
(Single mixer; attenuation increases as additional mixers are linked)

Overload and Shorting Protection
Shorting the inputs or outputs, even for prolonged periods, will cause no damage; mic inputs will not be damaged by signals up to 3V; aux inputs will not be damaged by signals up to 10V

Logic Terminals (all specifications referenced to Logic Ground terminals)
Inputs (Override, Mute)
High (inactive): Greater than 1.9V (5.0V typical) (no input current with 5.0 to 20V applied)
Low (active): Less than 1.9V (0V typical) (sources 80 μA when grounded)
Min/Max Applied Voltage: ±20V

Outputs (Gate)
High (inactive): 5.0V in series with 10k resistance (sources 0.2 mA with 3.0V output) (min/max applied voltage: −0.5 to +15V)
Low (active): Less than 0.5V sinking (100 mA max)

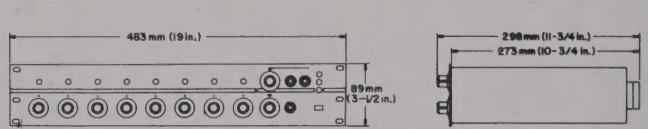


LOGIC EQUIVALENT CIRCUIT DIAGRAM
FIGURE 1

Operating Voltage
105-132 Vac, 50/60 Hz, 20W (fused internally). Can be rewired for 210-264 Vac operation (see 240V Operation)

Temperature Range
Operating: −29° to 57°C (−20° to 135°F)
Storage: −29° to 71°C (−20° to 160°F)

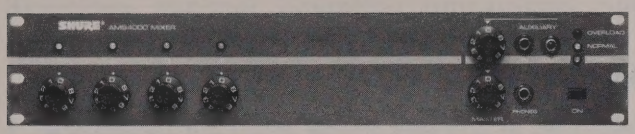
Dimensions
See Figure 2

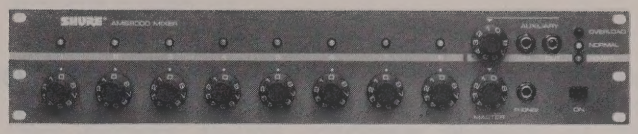


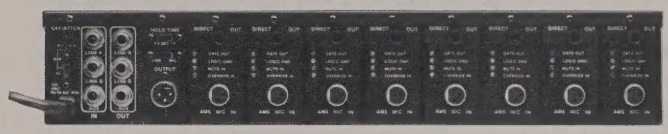
OVERALL DIMENSIONS
FIGURE 2

Weight
AMS8000: 6.6 kg (14 lb 8 oz)
AMS4000: 5.8 kg (12 lb 13 oz)
AMS8000 (packaged): 8.4 kg (18 lb 8 oz)
AMS4000 (packaged): 7.6 kg (16 lb 13 oz)

Certifications
Listed by Underwriters Laboratories, Inc.; listed by Canadian Standards Association as Certified







DESCRIPTION

The Shure Automatic Microphone System (AMS) turns microphones on and off (with automatic gating), greatly reducing the reverberant sound quality and feedback problems often associated with the use of multiple microphones. The special AMS microphones are gated on only by sounds arriving from the front within their acceptance angle of 120°. Other sounds outside the 120° angle, including background noise, will not gate the microphones on, regardless of level. In addition, the AMS adjusts gain automatically to prevent feedback as the number of "on" microphones increases.

The resulting sound is clearer than that of conventional multiple microphone speech reinforcement and recording systems—and free of the clipped and missed words, clicks and pops, and noise pumping often associated with other "automatic mixer" systems. Besides its major advantages of simple setup and unmanned operation, the Automatic Microphone System operates over an extremely wide dynamic range without the possibility of threshold-setting misadjustments.

AMS mixers are supplied in 4- and 8-channel configurations (Models AMS4000 and AMS8000), each housed in a single 3 1/2-inch rack-mount package. Both contain logic terminals (for channel muting, override functions, and gating indications), and link circuitry for expansion to as many as 200 linked channels.

The front panel contains four (AMS4000) or eight (AMS8000) microphone channel gain controls, and channel LED indicators that turn on when that channel's microphone is gated on. A master gain control is provided, as is an aux level control that controls aux-level signals entering the aux in phone jack. Aux out phone jacks provide an aux level output to feed a tape recorder with the combined gated microphone and non-gated aux input signals. A headphones jack permits monitoring the combined AMS signals with mono or stereo headphones. Overload and normal LEDs indicate output signal level, and a Power LED above the On switch indicates that the unit is on.

Each microphone channel rear panel contains a microphone input connector (XLR), direct out jack, and logic terminal block for special functions. In addition, the rear panel contains linking jacks for expanding the number of channels in the system, an off-attenuation control and switch to select proper attenuation for smooth gating action, a hold time switch to select the post-speech delay before microphone gating ceases, and a balanced XLR output that is microphone- and line-level selectable.

The AMS mixers are designed to operate at 120 Vac, 50/60 Hz. An additional fuse is provided to permit operation at 240 Vac, 50/60 Hz.

AMS mixers are Listed by Underwriters Laboratories, Inc., and are listed by Canadian Standards Association as Certified.

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WARNING

Voltages in this equipment are hazardous to life. Refer all internal wiring modifications and servicing to qualified service personnel.

MAINTENANCE

The Shure AMS Mixers are extremely well-designed units. All components are of the highest quality, and operate well within their respective ratings to assure long, reliable life. The following list of DO's and DON'Ts describes minimal operating precautions and maintenance to provide years of dependable service.

- DO unplug the mixer before cleaning or servicing. DO clean outer surfaces with a clean, damp cloth and (if necessary) a mild detergent. DON'T use strong solvents or cleaning fluids.
- DO use a high-quality extension cord when additional line cord length is needed. DON'T use inexpensive lamp cord, especially where it may be stepped on or kicked.
- DON'T operate the mixer on or near a radiator or other heat-producing equipment.
- When operating the mixer at 240 Vac, DON'T replace the 0.25 mA, 250V slow-blow T125 mA/250V fuse (located on Power board A5) with another size or type.
- DON'T risk fire or shock hazard by operating the mixer in rain or extreme moisture.
- DON'T use conventional condenser, dynamic, ribbon, or other microphones with the AMS mixer; they will not operate properly.
- DON'T ignore the effects of room noise, reverberation, talker distance and angle, and reflective surfaces on proper microphone gating and AMS system operation.

TROUBLESHOOTING

Should any difficulty be encountered in mixer operation, the problem can often be traced to some simple source such as an error in interconnection. Table 1 is a basic guide to this type of problem.

CIRCUIT OPERATION (See Figures 10 ff.)

The AMS operates on the following principle. The signal level in two closely spaced, back-to-back cardioid microphone elements are compared to determine the direction of a sound source. Only a sound source within the 120° acceptance angle will cause the level of the front-facing element to exceed the level of the rear by 9.54 dB or more. The processing circuitry in each AMS mixer channel responds to this condition and gates its front-facing microphone element signal through to the output of the mixer for at least the duration of the hold time (0.5 or 1.0 seconds). This principle eliminates the need for threshold adjustments and allows sensitive, reliable gating, even under varying acoustic conditions.

A block diagram of one channel of the mixer is shown in Figure 3. The front and rear signals from the back-to back cardioid electret condenser elements of the microphone undergo identical signal processing before reaching the comparator. The front-facing element signal enters through pin 2 of connector J102, and the rear through pin 3 of J102. Resistors R108, R109, R132, and R133 provide appropriate powering for the two impedance converter ICs in the microphone. The microphone preamplifiers (Q101, Q102, U101A, and U101B) provide preliminary amplification of the low-level impedance converter outputs. Input transistors Q101 and Q102 provide a low equivalent input noise voltage to minimize high-frequency noise when very long cables with greater than 0.1 μF total conductor-to-shield capacitance are used. The frequency equalization circuits that follow (U103A, U103C) apply equalization approximating an A-weighted curve to maximize sensitivity to voice frequencies.

The characteristics of the level-sensing circuitry are critical to gating performance. The circuitry must provide an accurate, rectified filter level with proper filter time constants and close matching between front and rear signal levels. In order to accommodate the widest range of applications, it must do this over a dynamic range of 60 dB. To achieve this with a minimum of adjustments, a logarithmic detector circuit (U103B, U103D) is used, in which a single monolithic transistor array (U104A, U104B) supplies the logarithmic conversion elements for both front and rear to ensure accurate tracking with changes in temperature. A single factory-preset trimpot (R151) provides a dc offset between front and rear detectors equivalent to the required 9.54 dB level difference. The outputs of the circuits appear across capacitors C133 and C134, and represent the front and rear levels with a scale factor of -3 mV/dB. Current injected by resistors R145, R146, and R147 sets the low-level limit of detector operation. Diodes D103-D106 protect the transistor array from reverse voltage.

When the front/rear level comparator senses that the front level has exceeded the rear by 9.54 dB (pin 11 of U105B is momentarily more negative than pin 10), it will quickly discharge capacitor C135 to -15 volts. Pin 14 of U105A switches to a positive voltage until resistor R152 recharges the capacitor to a voltage determined by the hold time bus (pin F of P102). The voltage on this bus is set by the Hold Time switch (S302) to control the hold time at 0.5 or 1.0 seconds.

U106A, U106B, and associated components control and shape the drive current to the gate switch opto-isolator (U102) and channel-on (D1) LEDs. This in turn controls the turnon and turnoff times of the gate switch photoresistor. A rise time of 4 msec is quick enough to avoid cutting off beginning consonants while still

TABLE 1. TROUBLESHOOTING

Symptom	Probable Cause	To Diagnose or Correct
No sound	Channel control or Master control turned too far down; microphone cable out of phase; microphone not connected; mixer not connected to power source; Power switch not on	Make indicated correction.
	Defective microphone, cable, channel input module	Listen to headphones plugged into the AMS front-panel Phones jack. To check microphone: Replace suspect microphone with another. If there is sound, replace microphone cartridge and PC board assemblies, or return the unit to the Shure Service Department for repair; if there is still no sound, check cable. To check cable: Replace suspect cable with another. If there is sound, repair or discard defective cable; if there is still no sound, check input module. To check input module: Connect microphone and cable to another channel and follow initial setup procedure. If there is sound, replace or repair defective input module; consult Shure Service Department.
	Defective power amp, tape deck, speakers, etc.	If there is sound on headphones but no sound from system, check other components and cables.
	Defective AMS mixer	If there is no sound on headphones, consult Shure Service Department.
Erratic microphone gating	Reflective surface near microphone (closer than 200 to 300 mm—8 to 12 in. not including tabletop for surface-mount models); talker positioned on edge of microphone acceptance angle; excessive steady room noise; defective microphone, cable, or input channel	If there is a reflective surface near microphone, and neither microphone nor surface can be moved, cover surface with a sound-absorptive material at least 100 mm (4 in.) thick. If talker is on edge of acceptance angle, move microphone or talker. If loud, steady room noise (typically from air-handling equipment) swamps out quiet speech, reduce room noise to reasonable conference levels or reduce talker-to-microphone distance. If none of above, check microphone, cable, channel, and system as in NO SOUND section.
Distorted sound	Master or Channel control set too high; defective microphone, cable, or channel; defective amplifier, recorder, or speaker	Check that red Overload LED is not on; if on, turn down Channel or Master control until LED goes out. If Overload LED is not on, check whether one or all microphones sound distorted. If only one is distorted, check microphone, cable, and channel as in NO SOUND section. If all microphones are distorted, remove AMS mixer from system, and connect undistorted signal source to system inputs. If final sound is still distorted, check system components and recording level. If final sound is **not** distorted, consult Shure Service Department.
Microphone gates on for unintended sound	Source is within 120° acceptance angle	Move source or microphone if possible.
	If source is outside 120° acceptance angle: microphone cable defective or wired out of phase; input module defective	Repair or replace cable. If microphone still gates on, check microphone and channel as in NO SOUND section.
Excessive hum from one or more microphones (proper gating may be affected)	Microphone input ground loop	Make sure microphone cable shield and 3-pin connector shells are **not** connected to earth or grounded metallic objects. Shield ground connection should only be made at AMS mixer input connectors.

avoiding a click at turnon caused by abrupt switching. The sound decays smoothly in 300 msec following the hold time.

A TTL-compatible Gate Out logic terminal (TS101) follows the timing of the gate switch. Logic input terminals (Mute In, Override In) allow the channel to be forced on or off, independent of the acoustic input to the microphone. These can be activated by digital logic signals or switch closures to ground.

The audio signal is taken from the front preamplifier before the sensing circuit equalization. A direct output (J101) is made available which appears as a conventional non-gated cardioid microphone. The channel level control (R182) adjusts the level of the microphone in the mixer output, but in no way influences the gating characteristics.

Gating is made less noticeable by the mixer's ability to maintain the microphones slightly on at all times, even when gated off. This off-attenuation function is obtained through a separate mix bus (pin D of P102 and P206), in addition to the main mix bus for the gated signals (pin E of P102 and P206). The main mix bus not only serves to combine the gated signals from the multiple microphone channels, but also performs gain compensation for the number of open microphones. The closing of additional gate switches as more microphones gate on loads down the bus, reducing the gain of each microphone. The automatic gain adjustment inherently tracks the rise and fall times of the gate switch photoresistors.

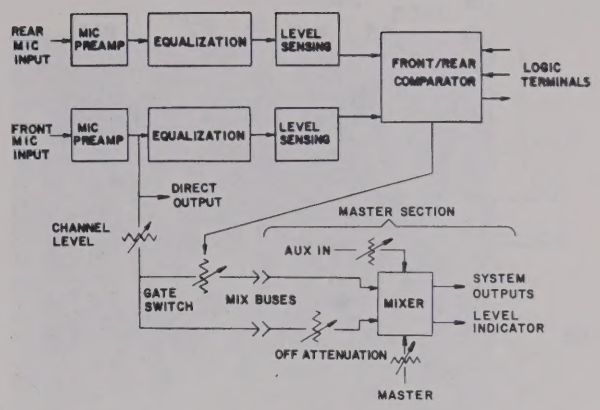
Additional mixers can be linked to the mix bus for a system of over 200 microphones. There should be only one terminating resistor (R304) for the linked bus. This is accomplished automatically through a switch terminal on the Link A Out jack (J304). The last mixer in a linked group terminates the bus. The off-attenuation bus must also be linked. It must be attenuated as additional mixers are linked to avoid a buildup in the off-attenuation level with large numbers of microphones. A bus terminating resistor and switching jack arrangement (R305, J305) similar to the gated signal mix bus is used to accomplish this.

U204B and U204A amplify the gated and non-gated mix bus signals, respectively. Potentiometer R301 and switch S301 control the level of the nongated microphone signals. These signals are combined with the Aux In (J303, J401) signal in the Master level control-mixer stage U201B. The output stage (U203B, Q201-Q206) is muted at turnon and turnoff by Q207, Q210, and Q211. Output signal level indications are provided by U202, Q208, Q209, D2, and D3. Diode D2 flickers with normal signal levels, and D3 flashes for 50 msec when clipping levels are approached.

SERVICE INSTRUCTIONS

WARNING

Voltages in this equipment are hazardous to life. No user-serviceable parts inside. Refer all servicing, including modifications, to qualified service personnel.



ONE AMS MIXER CHANNEL BLOCK DIAGRAM
FIGURE 3

REPLACEMENT PARTS

Parts that are readily available through local electronic parts distributors are not shown on the accompanying Parts List. Their values are shown on the Circuit Diagrams. Commercial parts not readily available and unique parts are shown on the Parts List and may be ordered directly from the factory.

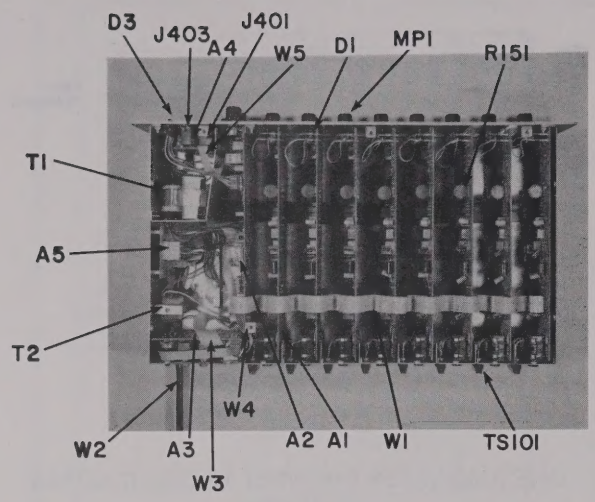
The commercial alternates shown on the Parts List are not necessarily equivalents, but may be used in the event that direct factory replacements are not immediately available. To maintain the highest possible performance and reliability, Shure factory replacement parts should be used. When ordering replacement parts, specify the Shure Replacement Kit Number (RKC) or part number, description, product model number, and serial number.

SERVICE ACCESS

AMS mixers can be disassembled for modification or service as follows (see Figure 4):

1. Remove line cord from ac power source.
2. Remove screws securing top cover to chassis.
3. Remove individual Channel boards (A1) by removing: (a) Channel board bottom screw; (b) Channel Level control knob (MP1) and nut; (c) Channel-On LED (D1) leads; and (d) ribbon cable connector (W1).
4. When replacing Channel boards, be sure to perform steps 3(a) through 3(d) in reverse order.
5. Remove Master board (A2) by removing: (a) two Master board retaining screws; (b) Auxiliary and Master control knobs and nuts; (c) voltage regulators U205 and U206 (regulators are secured by two screws and nuts holding regulator bracket to bottom of chassis); and following interconnections:

Wiring Assembly/Connector	PC Connector
W401	P201
J5	P202
J3	P203
W301	P204
J2	P205
W1	P206
W302	P207



PRINTED CIRCUIT BOARD AND PARTS LOCATION
FIGURE 4

6. Remove Rear Panel board (A3) by removing: (a) bushing securing power cord; (b) two screws securing Off-Atten switch (S301), Hold Time switch (S302), Line-Mic switch (S303), and Output jack (P301); (c) nuts and washers holding Link A, Link B, and Aux In and Out jacks (J301-J306); power cord spring wire (soldered to board); and interconnections W301 and W302 (from P204 and P207 on Master board), and J4 (from P302). (NOTE: Board A3 and associated rear panel can be removed as an assembly by removal of two screws at bottom of chassis.)

7. Remove Front Panel board (A4) by removing: (a) nuts and washers securing Phones and Aux In and Out jacks (J402, J401, and J403); and (b) interconnection W401 (from P201).

8. Remove Power board (A5) by removing: (a) four screws securing it to side of chassis; (b) interconnection J1 (from P503); and (c) Power cord terminals A and B (from W2).

Other components whose proper removal may not be readily apparent are described in the following paragraphs.

Channel-on LEDs. These indicator LEDs (D1) are removed by grasping the nylon housing near the leads and forcing the LED forward and out through the front panel. Disconnect the red and white leads from the Channel board if total removal is necessary.

Power Transformer. Remove transformer T1 by disconnecting J1 (from P503) and J2 (from P205) (the red leads to Power switch S1 remain attached to J2), unsoldering the red transformer leads to Power switch S1, and removing three screws securing the shield to the chassis. Remove the red-yellow lead from J2 (P205).

Power Switch. Remove Power switch S1 by first removing Front Panel board A4 and transformer T1 as described above. Then unsolder the four switch terminal leads, and remove the screw holding the switch bracket to the side of the chassis, and the nut holding the bracket to a captive screw on the front panel.

Power, Normal, and Overload LEDs. Remove the red and white leads of the desired LED from J2 (at P205), and remove the LED from the front panel like the Channel-on LEDs described above. Refer to the interconnection diagram when reconnecting the LED.

FUSE REPLACEMENT

In 120 Vac operation, to replace line fuse F502 (see Caution below), disconnect the power cord from the ac source and remove the top cover from the chassis. On Power board A5, remove the defective fuse and replace it with a 1/4-ampere, 250-volt, 3AG slow-blow fuse (Littelfuse 213000 series, Shure 80H159).

CAUTION

If trouble symptoms—overheating, erratic operation, etc.—were apparent before the fuse blew, or if the replacement fuse blows, a qualified serviceman should troubleshoot the mixer carefully to find the source of the trouble. Do not continue to replace fuses until the trouble is corrected.

INTERNAL WIRING MODIFICATIONS

This section describes a number of internal wiring modifications that contribute to the versatility of AMS mixers. The AMS Installers Manual explains the specific application or logic function of each modification.

240-Volt Operation

To change the AMS mixer operating voltage from 120 Vac to 240 Vac, follow these steps:

1. Locate the Power board (A5).
2. *EARLY PRODUCTION:* Remove the jumper plug from connector P502 (marked 120 VAC) and carefully insert it in connector P5101, making sure all six pins are properly engaged.

   LATER PRODUCTION: Remove power transformer T1's input connector J1 from the Power board 120 VAC plug. Reinsert the transformer input connector in the Power board 240 VAC plug.
3. Insert the T125mA/250V fuse (packaged with the AMS mixer) in the fuseholder marked F501.
4. Replace the ac connector with one designed for the 240-volt source. If the mixer is to be used outside the U.S. and Canada, local regulations may require replacing the line cord with one having wire insulation colors as follows:

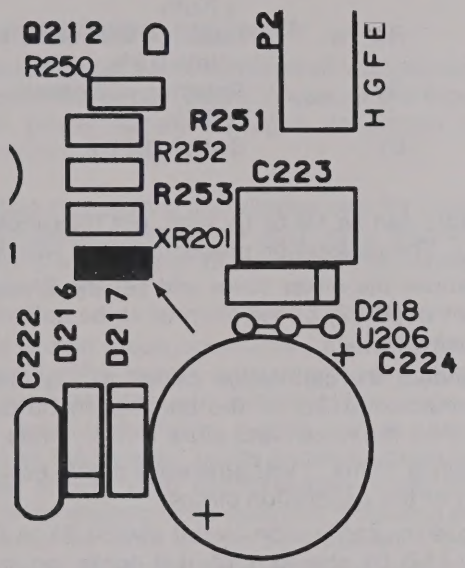
	"Live" or "Hot"	Neutral	Earth or Ground
U.S., Canada	Black	White	Green
Europe	Brown	Blue	Green/Yellow

5. Mark the rear panel of the mixer with the new operating voltage.

Hold Time Increase

The 1.0 Sec position of the rear-panel Hold Time switch (S302) can be increased to 2 seconds as follows:

1. With the top cover removed, locate the Master board (A2).
2. For AMS4000 mixers, no further disassembly is necessary; for AMS8000 mixers, remove the Channel 8 board as described above.
3. Solder a 30k, 1/4W resistor in the Master board holes marked XR201 (see Figure 5).
4. Reassemble the mixer and mark the Hold Time switch position "2.0" instead of "1.0".



MASTER BOARD A2: XR201
FIGURE 5

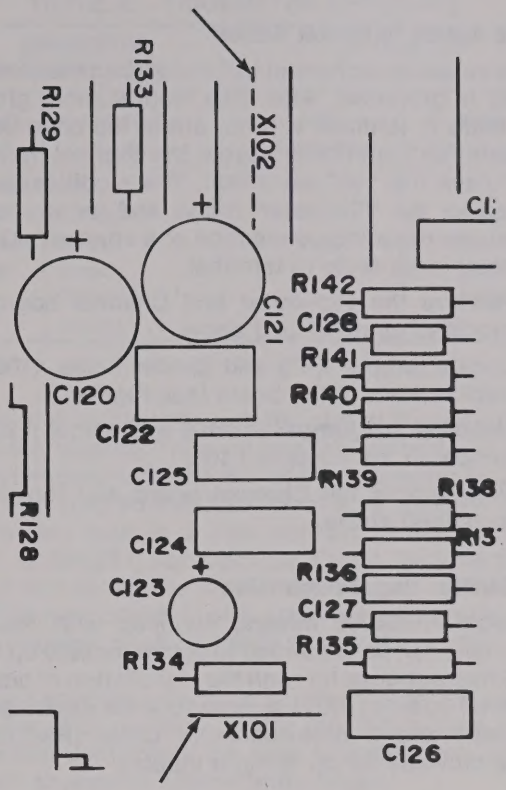
Pre-Fader to Post-Fader

The Channel Level control (R182) can be rewired to **also** control the rear-panel Direct Output (J101) level as follows:

1. Remove the top cover and the Channel board to be modified.
2. Locate jumper X101 at the top center of the Channel board, and jumper holes X102 at the bottom center of the board (see Figure 6).
3. Unsolder the jumper at X101 and solder it or a new jumper in the holes of X102.
4. Reassemble the Channel board and top cover as described above.

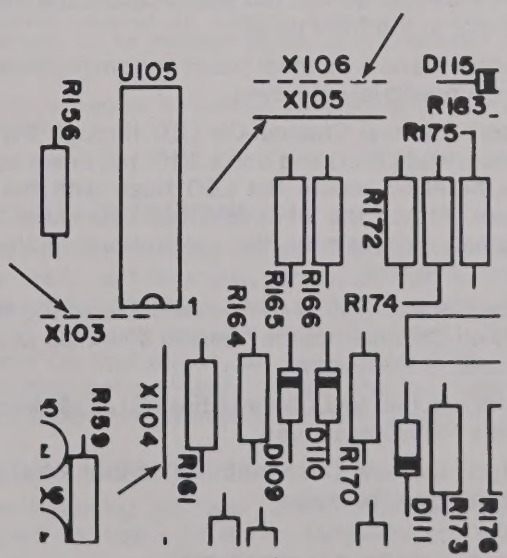
Mute Precedence to Override Precedence

As supplied, if a channel's Mute In and Override In logic terminals (TS101) are both grounded, the mute function will take precedence over the override function and the channel will be muted. With the following modification (both logic terminals grounded), the override function will take precedence over the mute function and the channel will be forced on. Note that after modification the Channel Level control will still turn the channel off at the full counterclockwise position (independent of the Override In terminal).



CHANNEL BOARD A1: X101 AND X102
FIGURE 6

1. Remove the top cover and Channel board to be modified as described above.
2. Locate jumper X104 and jumper holes X103 on the Channel board near integrated circuit U105 (see Figure 7).
3. Unsolder the jumper at X104 and solder it or a new jumper in the holes of X103.
4. Reassemble the Channel board and top cover as described above.



CHANNEL BOARD A1: X103–X106
FIGURE 7

Mute Action to Inhibit Action

As supplied, a channel will mute when the Mute In terminal is grounded. After this modification, grounding the Mute In terminal will not affect the channel if it is already "on," but it **will** prevent the channel from gating "on" from the "off" condition. The modification is required for the "Filibuster" mode, and for any logic terminal use requiring connection of a channel's Gate Out terminal to its Mute In terminal.

1. Remove the top cover and Channel board to be modified as described above.
2. Locate jumper X105 and jumper holes X106 at the bottom front of the board (see Figure 7).
3. Unsolder the jumper at X105 and solder it or a new jumper in the holes of X106.
4. Reassemble the Channel board and top cover as described above.

AMS4000: Input Expansion

Model AMS4000 mixers, supplied with four input channels, can be expanded to accommodate up to eight AMS microphones through the installation of additional Channel boards (RKC188; order one for each additional channel) and a nine-connector cable (RKC189; one cable provides for up to eight inputs).

1. Remove the top cover as described above.
2. Remove the five-connector cable (W1) between the Channel boards, and remove the blank rear plate of each channel to be added.
3. Using the template supplied with the Channel board, drill the front-panel nameplate holes for LED D1 (0.254" ±0.005") and Channel Level control R182 (0.312"± 0.005") for each channel to be added. (NOTE: It is not necessary to drill the front panel for the rectangular locator pin.)
4. Insert the new Channel board from the rear, making sure the rectangular locator pin is properly centered in its mounting hole.
5. Use the supplied nut and washer to secure the level control to the front panel.
6. Secure the new Channel board bottom plate with the screw previously removed.
7. Insert the new Channel-On LED through the front panel (leads first) and use a 3/16" nut driver against the bezel to secure the LED flush with the front panel. Attach the white and red LED leads to the marked terminals at the upper front of the new Channel board.
8. Attach the new nine-connector cable to the Master and all Channel boards (unused channels will have unused connectors).
9. Calibrate the new Channel boards(s) as described in the following section.
10. Attach the new Channel Level control knob (MP1) and replace the cover.

CHANNEL BOARD CALIBRATION

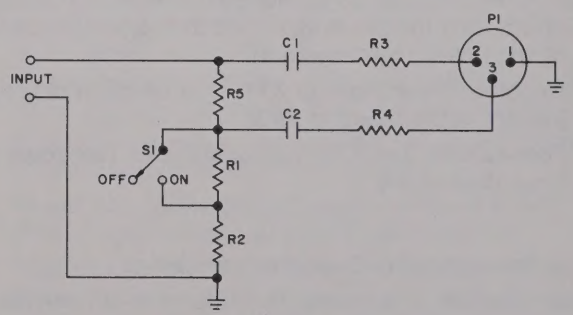
When a Channel board (A1) is replaced, when Channel boards are added to an AMS4000 Mixer, or when parts in the preamplifier, equalization, level sensing, or comparator sections of a Channel board are replaced, the replaced, new, or repaired Channel board(s) must be calibrated. (**IMPORTANT**: If the positive voltage regulator U206 is replaced, **all** Channel boards must be calibrated.)

The calibration circuit shown in Figure 8 is required for proper adjustment of Channel boards. Circuit components are as follows:

C1, C2	Capacitor, 0.1 μF
R1	Resistor, 6.8 ohms ±5%
R2	Resistor, 198 ohms ±0.5%
R3, R4	Resistor, 51k, matched within 0.5%
R5	Resistor, 400 ohms ±0.5%
S1	Switch, SPST

Resistors can be 1/4 or 1/2 watt, but tolerances are important. The calibration procedure is as follows:

1. Remove the mixer cover and set the Channel Level control (R182) of the channel to be calibrated fully clockwise.
2. Connect the calibration circuit to the AMS Mic In connector (J102) of the channel to be calibrated, turn on the mixer, and allow a five-minute warmup.
3. Apply a 10 mV, 1 kHz sine-wave signal across the input of the calibration circuit.
4. Move the calibration circuit switch S1 to On. Channel LED D1 should light. If it lights, go to the next step. If it does not light, adjust the Channel board potentiometer R151 until it does.
5. Move the calibration circuit switch S1 to Off. Channel LED D1 should turn off. If it does, go to the next step. If it does not turn off, adjust R151 until it does; then return to step 4.
6. Disconnect the calibration circuit and replace the cover.



CHANNEL BOARD CALIBRATION CIRCUIT
FIGURE 8

TRANSISTORS AND INTEGRATED CIRCUITS

All transistors and integrated circuits are mounted on printed circuit boards. When replacing these parts, it is imperative that proper lead configuration be followed. A minimum of soldering heat (25W maximum iron) should

be used to avoid damage to the part or printed circuit board. When replacing regulators U205 or U206, apply Wakefield Type 120 thermal joint compound to assure good heat transfer. Refer to the NOTES TO SERVICE ILLUSTRATIONS for transistor and integrated circuit lead codes.

TRANSISTOR AND DIODE REMOVAL

Transistors and diodes used in the mixer are mechanically supported by their leads. When replacing these devices, proper lead configurations must be followed. Minimum soldering heat (preferably with a low-wattage—25W maximum—soldering iron) should be used to avoid damage to the device.

ACTIVE COMPONENT CHECKING

Integrated circuits can be checked without removing them from their circuit board. Measure the input, output, and power supply voltages as shown on the applicable circuit diagram.

Defective transistors and diodes can be located by use of a standard ohmmeter such as a Simpson 260. Polarity of the ohmmeter must be verified before these checks are made.

With a known diode orientation, measure the diode resistance in the foward and reverse directions. The lowest meter reading will establish the probe at the cathode end (schematic symbol arrow points to cathode) as the "minus" probe on the cathode end, the ohmmeter should read approximately 2,000 ohms or less. With the meter probes reversed, a reading of about 10,000 ohms or more should be obtained. If either of these conditions is not met, the diode should be replaced.

To check LEDs, connect the cathode (notch or flat) of the LED to the negative terminal of a 9V transistor radio battery. Connect the positive battery terminal through a 4.7k resistor to the LED anode. Replace any LED that does not light.

CAUTION

Do not check LEDs with an ohmmeter. The LEDs may be damaged or erroneous readings may be obtained.

To check transistors, the ohmmeter should be set to the 100- or 1,000-ohm scale. Transistors and diodes must be removed from the circuit before testing. If all conditions in Table 2 are met, the transistor may be considered free of any major defect; if any of the following conditions are not met, the transistor should be replaced. See NOTES TO SERVICE ILLUSTRATIONS for transistor lead codes.

PRINTED CIRCUIT BOARD CONNECTORS

All printed circuit board connectors use the Molex KK Modular Interconnection System. To replace a lead and its associated connector contact, proceed as follows: Using a scribe or other pointed instrument, depress the contact through the slot at the side of the connector housing. This will free the contact and allow it to be removed from the rear of the connector housing. Trim a new lead so that 1/8 inch of wire appears. Insert the trimmed lead in a new contact (Shure Part No. 56A235 or 56A251, see Table 3). Crimp the wire to the contact and solder the wire to the crimped connection. Insert the new contact (with attached lead) in the connector housing, pushing firmly to lock the contact.

Table 3 provides reference information on the printed circuit board connectors used in the AMS mixers. When reinstalling connectors, be sure to apply even, steady pressure to prevent intermittent contact.

TABLE 2. TRANSISTOR CHECKING

OHMMETER CONNECTIONS		OHMMETER READING	
"Plus" Lead	"Minus" Lead	NPN Transistor	PNP Transistor
Collector	Emitter	High	High
Emitter	Collector	High	High
Collector	Base	High	Low
Emitter	Base	*	Low
Base	Collector	Low	High
Base	Emitter	Low	*

TABLE 3. PC BOARD CONNECTORS

Wiring Assembly/ Connector	Mating Connectors	Shure Part Number	Molex Part Number	Replacement Terminal
J1	P503	65B8032	10-01-1044	Shure 56A235
J2	P205	65A8032	10-01-1034	(Molex 2478)
J3	P203	65A1287	22-01-3047	
J4	P302	65A1287	22-01-3047	
J5	P202	65C1287	22-01-3067	Shure 56A251
W1*	P101, P206	95D8075**	22-26-9072	(Molex 2579)
W3	P204,P303	95A8075**	22-26-9042	
W4	P207, P304	95E8075**	22-26-9082	
W5	P201, P401	95A8075**	22-26-9042	

* Normally supplied as complete 9-connector cable assembly (RKC189), or, for AMS4000 Mixers, as a 5-connector assembly (90A8175).

** Normally requires tool-inserted cable; listed terminal is hand-crimped.

SERVICE ILLUSTRATIONS

Immediately following the parts list on the pages that follow are circuit diagrams, parts locating photographs, and board foil drawings. Once a board has been located through the parts location photo (Figure 4), the components on that board can be located from the corresponding parts location photo. The function of the part is shown on the adjacent circuit diagram.

OPTIONAL ACCESSORIES

The following optional accessories are specially designed for use with Shure AMS4000 and AMS8000 Mixers:

AMS22	Low-Profile Microphone
AMS24	Gooseneck Microphone

AMS26	Probe-Style Microphone
AMS28	Lavalier Microphone
AMS880	Video Switcher Interface
A26X	Desk Stand Extension
A30A	Mixer Carrying Case
A6000A	Oak-Finish Wood Mixer Enclosure
A6000W	Walnut-Finish Wood Mixer Enclosure
RKC188	Channel Board Assembly
RKC198	Nine-Connector Ribbon Cable (for AMS8000 replacement or AMS4000 expansion)

REPLACEMENT PARTS LIST

Reference Designation	Part No.	Description	Commercial Alternate
A1	RKC189	Channel Board	None
A2	90A8188	Master Board	None
A3	90A8111	Rear Panel Board	None
A4	90A8186	Front Panel Board	None
A5	90A8113	Power Board	None
C110, C118, C130, C206, C207, C220, C221	86N629	Capacitor, Electrolytic, 10 μF, 35V	Sprague 503D106F035LA
C115, C123	86A8601	Capacitor, Electrolytic, Low Leakage, 4.7 μF, 35V	Panasonic ECE-A35Z4R7
C120, C121	86C8601	Capacitor, Electrolytic, Low Leakage, 100 μF, 16V	Panasonic ECE-A16Z100
C201, C202	86H629	Capacitor, Electrolytic, 100 μF, 35V	Sprague 503D107F050PD
C215	86P629	Capacitor, Electrolytic, 47 μF, 35V	Sprague 503D476F035NB
C217, C224	86J629	Capacitor, Electrolytic, 1,000 μF, 35V	Sprague 503D108F050SJ
D1	90A8126	Diode Assembly, Gate On	None
D2	90A8130	Diode Assembly, Normal	None
D3	90B8130	Diode Assembly, Overload	None
D4	90C8130	Diode Assembly, Power	None
D101-D104, D107-D116 D203-D207, D211-D213	86A415	Diode, Computer, 75V	TI/GE 1N4148
D105-D106	86D422	Diode, Light-Emitting	Monsanto MV5075C
D117	86A414	Zener Diode, 10V, 400 mW	Motorola 1N5240A
D208-D210, D214-D218	86A404	Silicon Rectifier, 100V, 1/2A	Motorola 1N4002
F501	80G258	Fuse, 5 x 20 mm, 125 mA, 250V (240V operation)	Littelfuse 213000 Series
F502	80H159	Fuse, Slow-Blow, 3AG, 0.25A, 250V (120V operation)	Littelfuse 312000 Series
J1	65B8032	Connector, 4-pin	Molex 10-01-1044
J2	65A8032	Connector, 3-pin	Molex 10-01-1034
J3-J4	65A1287	Connector, 4-pin	Molex 22-01-3047

REPLACEMENT PARTS LIST (Continued)

Reference Designation	Part No.	Description	Commercial Alternate
J5	65C1287	Connector, 6-pin	Molex 22-01-3067
J101*	95A8043	Phone Jack, 2-conductor	ADC AJ318-1
J101*	95B8043	Phone Jack, 3-conductor	ADC AJ339-1
J102	95B8042	Connector, Receptacle, 3-pin	None
J301-J303, J306, J401, J403	90BL2600	Phone Jack, 2-conductor	None
J304-J305, J402	90BK2600	Phone Jack, 3-conductor	None
J501	90A8123	Connector Assembly, 6-terminal (early production)	None
L101-L102, L301-L306	80A365	Ferrite Bead (Choke)	Stackpole 57-3425
MP1	95A8041	Knob	None
P102, P206	95D902	Connector (Header), 7-pin	Molex 22-23-2071
P201, P203-P204, P302-P303, P401	95A902	Connector (Header), 4-pin	Molex 22-23-2041
P202	95C902	Connector (Header), 6-pin	Molex 22-23-2061
P205	95A8045	Connector (Header), 3-pin	Molex 10-19-1031
P207, P304	95E902	Connector (Header), 8-pin	Molex 22-23-2081
P301	95B8012	Connector, Receptacle, 3-pin	Switchcraft 5C1221A
P501-P502	95D8045	Connector (Header), 6-pin (early production)	Molex 10-19-1061
P501-P502	95B8045	Connector (Header), 4-pin (later production)	Molex 10-19-1041
P503	95B8045	Connector (Header), 4-pin (early production)	Molex 10-19-1041
Q101-Q102, Q204, Q206	86A348	Transistor, PNP	Motorola 2N5087
Q103, Q202, Q208-Q209	86A334	Transistor, NPN	RCA SK3444; Sylvania ECG123A
Q201	RKC66	Transistor, PNP	RCA SK3114; Sylvania ECG290
Q203, Q205, Q210-Q212	RKC89	Transistor, NPN	Motorola 2N5210
Q207	86A8311	Field-Effect Transistor, N-Channel	Siliconix J113-18

*Depending on original part.

REPLACEMENT PARTS LIST (Continued)

Reference Designation	Part No.	Description	Commercial Alternate
RV1	86A8904	Metal Oxide Varistor	GE V82ZA2
R108-R109	45MB912C	Resistor, Metal Film, 9.1k, 1/4W, 5%	Corning Type SMA
R113, R125	45MB124C	Resistor, Metal Film, 120k, 1/4W, 5%	Corning Type SMA
R118	45MB154C	Resistor, Metal Film, 150k, 1/4W, 5%	Corning Type SMA
R132-R133	45MB822C	Resistor, Metal Film, 8.2k, 1/4W, 5%	Corning Type SMA
R151	46B8008	Potentiometer, Trimmer, 10k	Mallory 1214V103
R182/S101	46A8004	Potentiometer, Linear Taper, 10K, with On-Off Switch	None
R201, R203	46A8003	Potentiometer, Audio Taper, 100k	None
R301	46A8005	Potentiometer, Linear Taper, 10k	None
S1	90B8118	Switch Assembly, Push-Button, Power	ITT Schadow NE15
S301-S302	55B8001	Slide Switch, DPDT	None
S303	55B8007	Slide Switch, DPDT	None
TS101	95A8044	Barrier Block	None
T1	51A8011	Transformer, Power	None
T2	90A8117	Transformer Assembly, Output	None
U101, U103	86A808A	Integrated Circuit, Quad Op Ampl	Raytheon RC4156DB
U102	86A8900	Opto-Isolator	None
U104	86A8805A	Integrated Circuit, 14-pin Dual In-Line Transistor Array	Motorola MC3346; RCA CA3046
U105, U202	86A806A	Integrated Circuit, Quad Comparator	National or Raytheon LM339DB
U106, U201	86A811A	Integrated Circuit, Dual Op Ampl	Raytheon RC4559NB
U203-U204	86A8804A	Integrated Circuit, Dual FET Op Ampl	Motorola MC34002P; National LF353N; TI TL072
U205	86A810A	Voltage Regulator, Negative	Motorola MC7915CT
U206	86A809A	Voltage Regulator, Positive	Motorola MC7815CT
W1	RKC188	Nine-Connector Cable Assembly (AMS8000)	None
W1	90A8175	Five-Connector Cable Assembly (AMS4000)	None

REPLACEMENT PARTS LIST (Continued)

Reference Designation	Part No.	Description	Commercial Alternate
W2	90A8128	Power Cord, 2.5m (100 in.), with Plug, Spring and Terminals	None
W3	90A8182J	Four-pin Connector and Cable Assembly	None
W4	90E8182C	Eight-pin Connector and Cable Assembly	None
W5	90A8182C	Four-pin Connector and Cable Assembly	None

NOTES TO SERVICE ILLUSTRATIONS

GENERAL

The pages that follow contain an interconnection diagram, circuit diagrams, parts locating photos, and board foil drawings.

Shure part numbers are not shown in the Parts List if parts are readily available through local electronics parts suppliers. In these instances, the circuit diagrams show only the reference designation and value of the standard parts.

All capacitor values are shown in microfarads unless otherwise designated. All non-electrolytic capacitors are 50 working volts dc or more unless otherwise specified. Electrolytic capacitors are shown in microfarads x volts.

All resistor values are shown in ohms (k = 1,000). Resistors are 5% tolerance unless otherwise specified. Resistors are 1/4 watt unless otherwise specified.

Transistor lead codes are shown in Figure 9. Acceptable replacements are shown in the Parts List.

The following ground symbols denote:

Chassis Ground

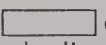
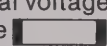
Circuit Ground

Printed Circuit Board Ground

TROUBLESHOOTING

A general troubleshooting process is as follows: If the mixer is completely "dead," check the ac power source, fuse, and regulated power supply (± 15V across pins C and B of connector P206). If the Power LED (D4) is on, but the output is low or not present, localize the problem and determine whether the input and output voltages to the suspect board are correct. If an incorrect voltage is found, perform ac and dc voltage measurements as described below to isolate the problem area.

AC VOLTAGE MEASUREMENTS

The numbers within rectangular symbols  on the circuit diagrams denote the ac voltages at that point under the following test conditions. Where dual voltages are shown, the open rectangle refers to the Override In logic terminal as open. The partly shaded rectangle  indicates the Override In terminal is shorted to logic ground.

1. Voltages are measured with respect to chassis unless otherwise indicated.
2. Line voltage is 120 Vac, 60 Hz.
3. Test signal of 10 mV, 1 kHz applied across pins 2 and 3 of connector J102.
4. Ac voltage measurements may vary ±20% from values shown.
5. Measurements are made with an ac VTVM of 1 megohm or greater input impedance.
6. All controls are in the full clockwise position.

DC VOLTAGE MEASUREMENT

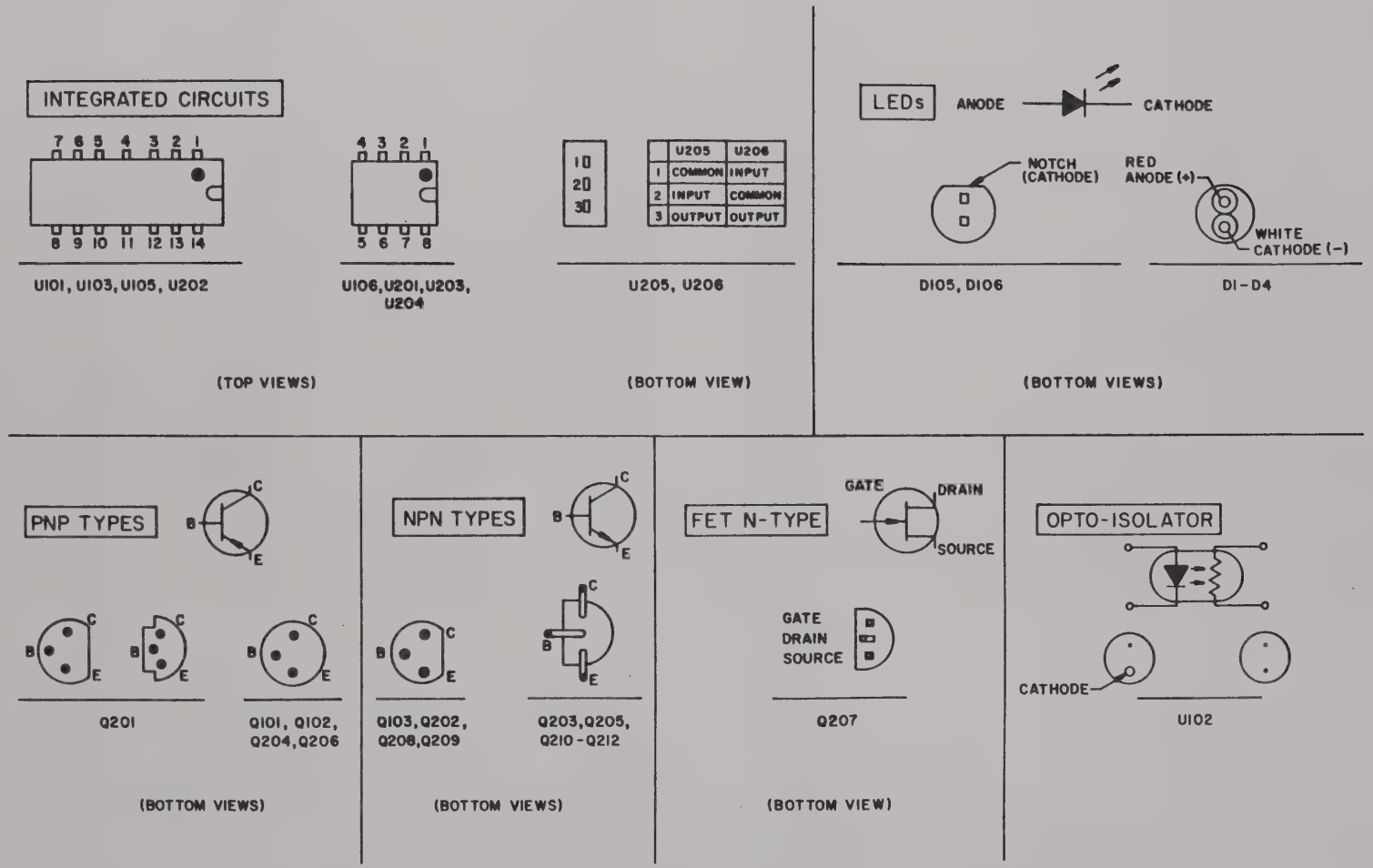
The numbers within elliptical symbols on the circuit diagrams denote the dc voltages at that point under the following test conditions. Where dual voltages are shown, the open ellipse refers to the Override In logic terminal as open. The partly shaded ellipse indicates the Override In terminal is shorted to logic ground.

1. Voltages are measured with respect to chassis unless otherwise indicated.
2. Line voltage is 120 Vac, 60 Hz.
3. No input signal is applied.
4. Dc voltage measurements may vary ±20% from values shown.
5. Measurements are made with A VTVM of 11 megohms or greater input impedance.

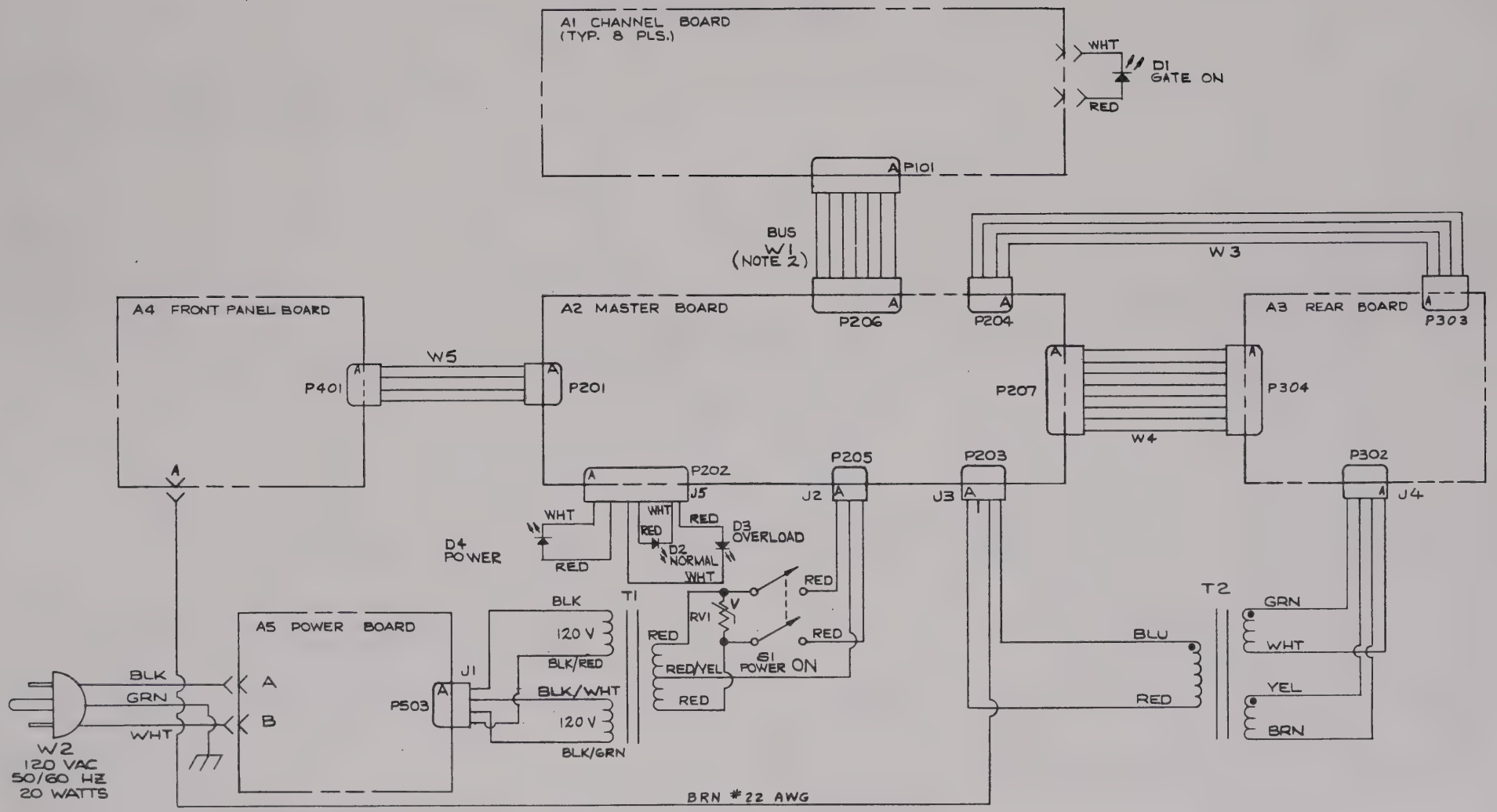
RESISTANCE MEASUREMENTS

With ac power cord disconnected from the ac source and the Power switch S1 in the Off position, the following ohmmeter measurements can be made:

1. Transformers can be checked for continuity of each winding.
2. To test integrated circuits, transistors, and diodes, refer to the section on Active Component Checking.



LEAD CODES
FIGURE 9

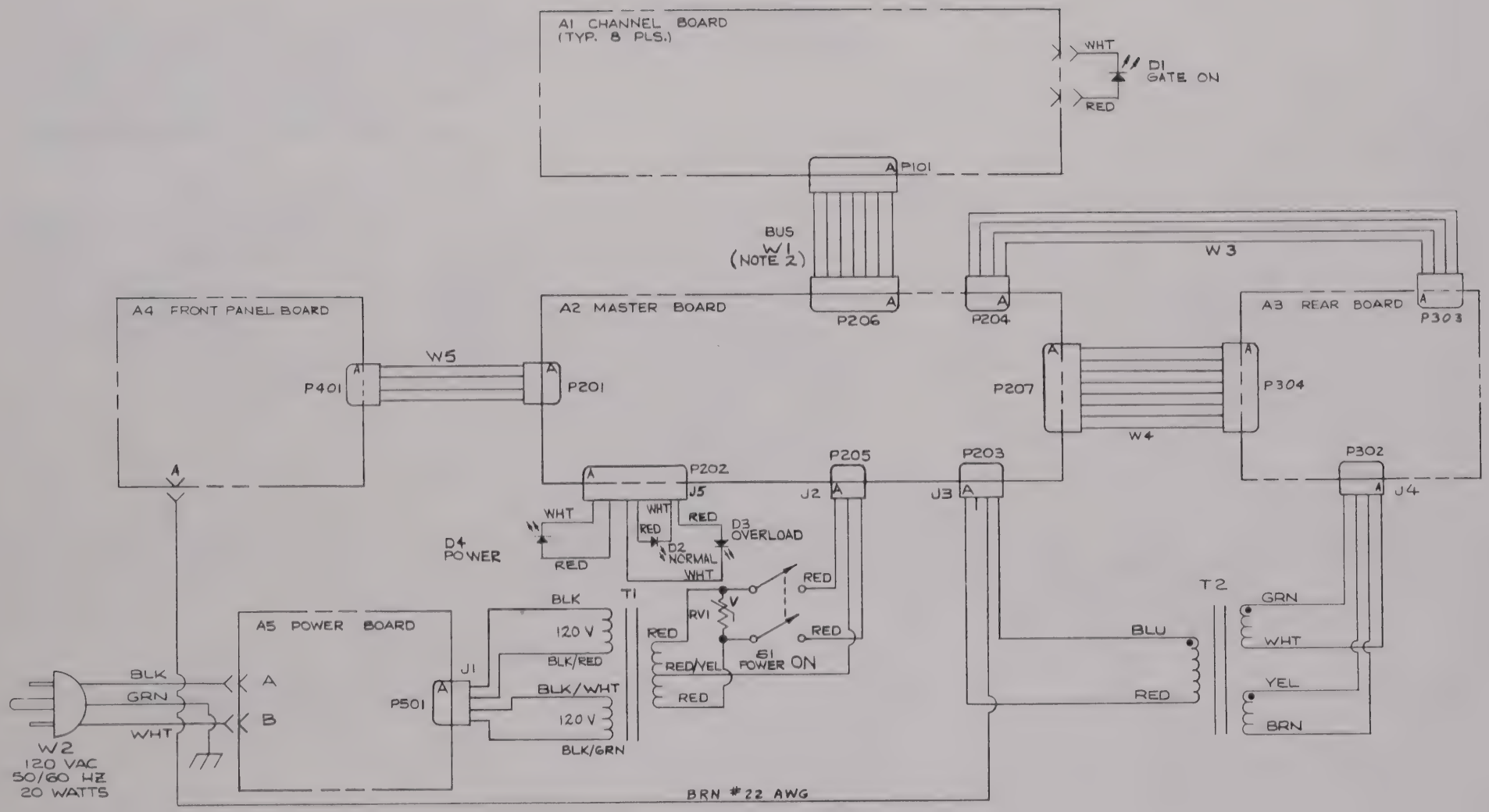


NOTES:

1. FOR THE REMAINDER OF SCHEMATIC SEE INDIVIDUAL PRINTED CIRCUIT BOARD SCHEMATICS.
2. BUS W1 IS A DAISY CHAIN CABLE ASSEMBLY WHICH CONNECTS ALL CHANNEL BOARDS A1 AND MASTER BOARD A2.
3. WHEN REPLACING POWER BOARD A5 *OR* POWER TRANSFORMER T1 WITH A NEW REPLACEMENT KIT, REWIRE CONNECTOR J1 AS INDICATED (IF *BOTH* ARE REPLACED, NO REWIRING IS NECESSARY).

8025-11-5

AMS8000 WIRING DIAGRAM
(EARLY PRODUCTION)

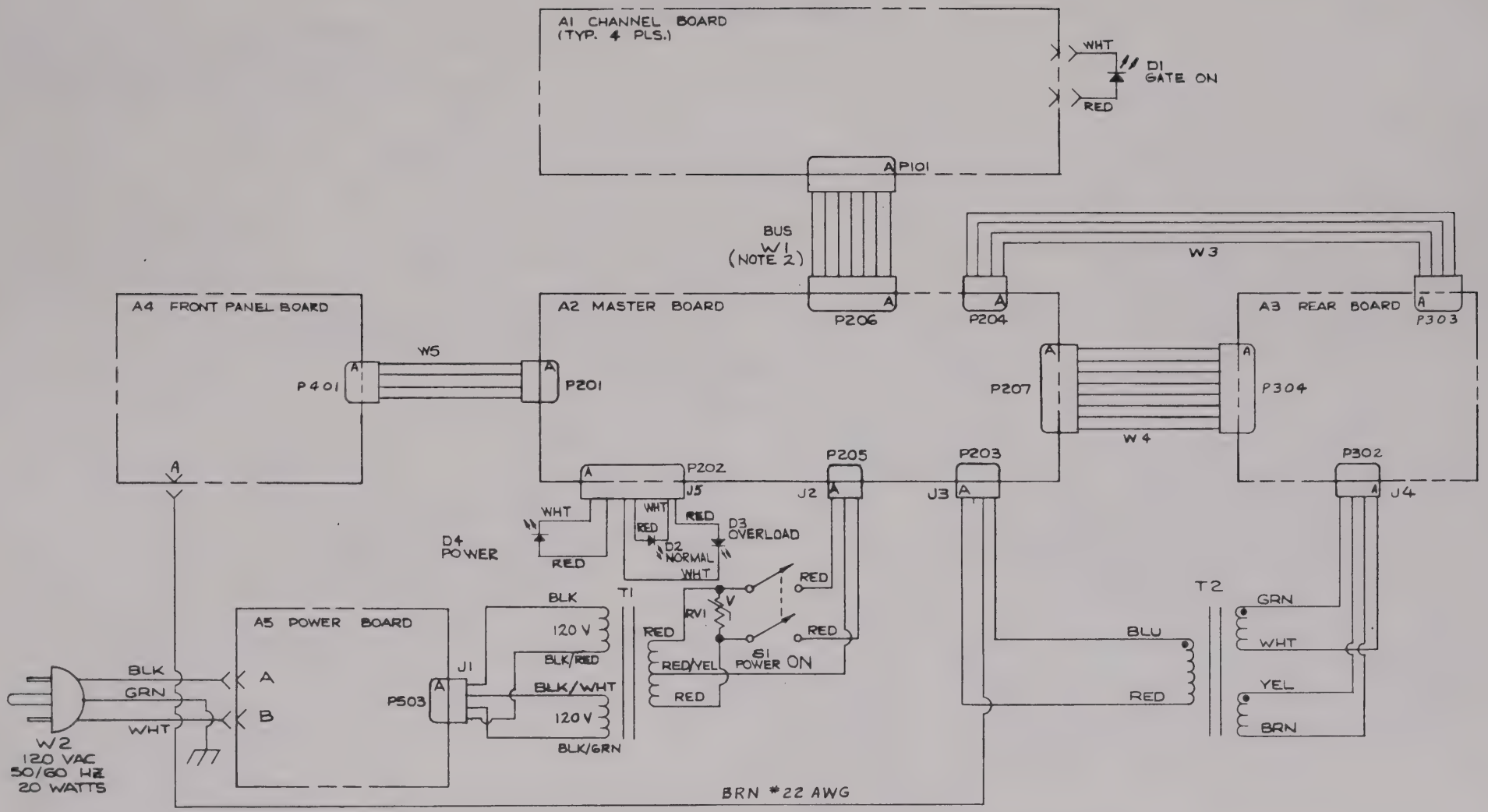


NOTES:

1. FOR THE REMAINDER OF SCHEMATIC SEE INDIVIDUAL PRINTED CIRCUIT BOARD SCHEMATICS.
2. BUS W1 IS A DAISY CHAIN CABLE ASSEMBLY WHICH CONNECTS ALL CHANNEL BOARDS A1 AND MASTER BOARD A2.

8025-11-7

AMS8000 WIRING DIAGRAM
(LATER PRODUCTION)

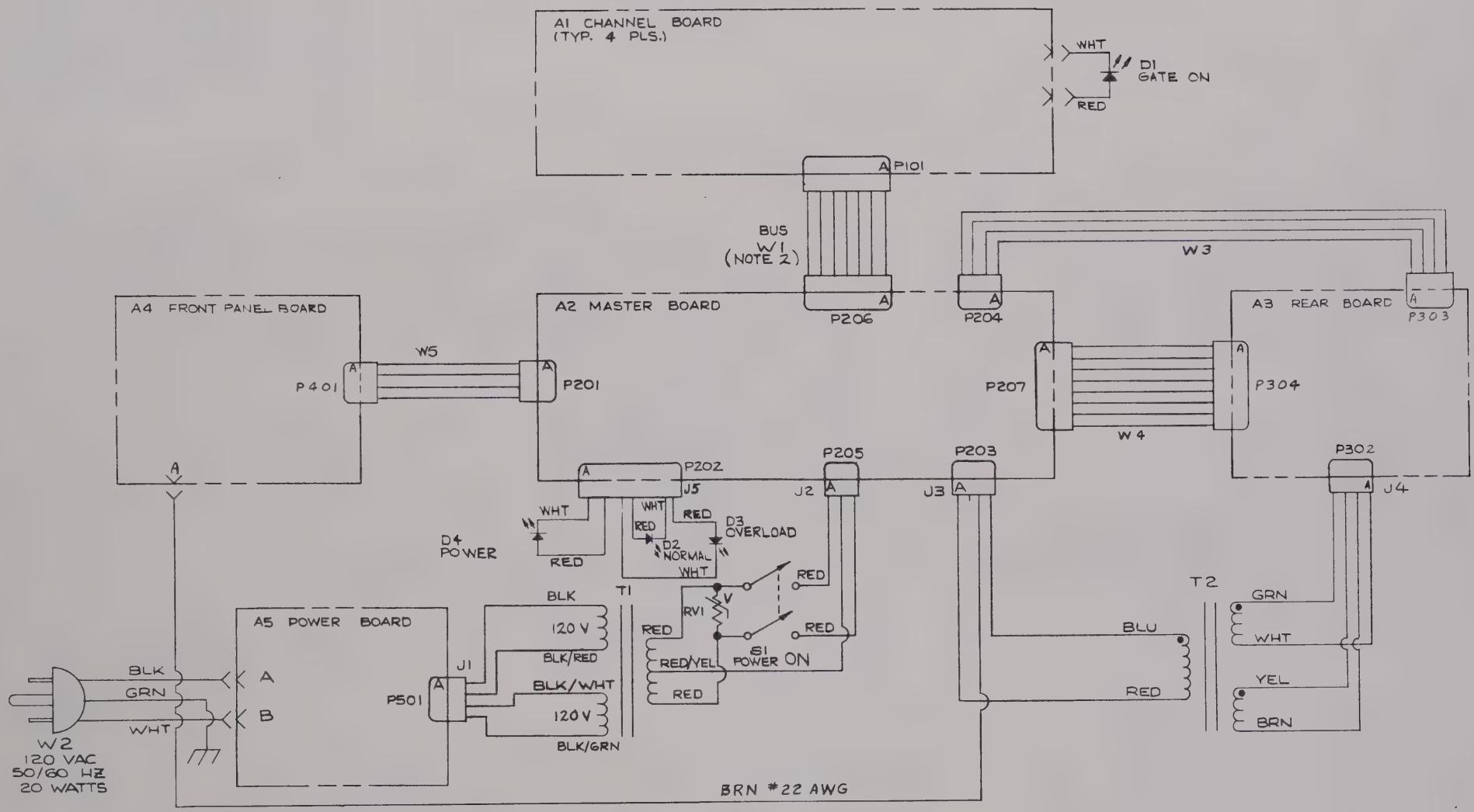


NOTES:

1. FOR THE REMAINDER OF SCHEMATIC SEE INDIVIDUAL PRINTED CIRCUIT BOARD SCHEMATICS.
2. BUS W1 IS A DAISY CHAIN CABLE ASSEMBLY WHICH CONNECTS ALL CHANNEL BOARDS A1 AND MASTER BOARD A2.
3. WHEN REPLACING POWER BOARD A5 *OR* POWER TRANSFORMER T1 WITH A NEW REPLACEMENT KIT, REWIRE CONNECTOR J1 AS INDICATED (IF *BOTH* ARE REPLACED, NO REWIRING IS NECESSARY).

8026-11-5

AMS4000 WIRING DIAGRAM
(EARLY PRODUCTION)

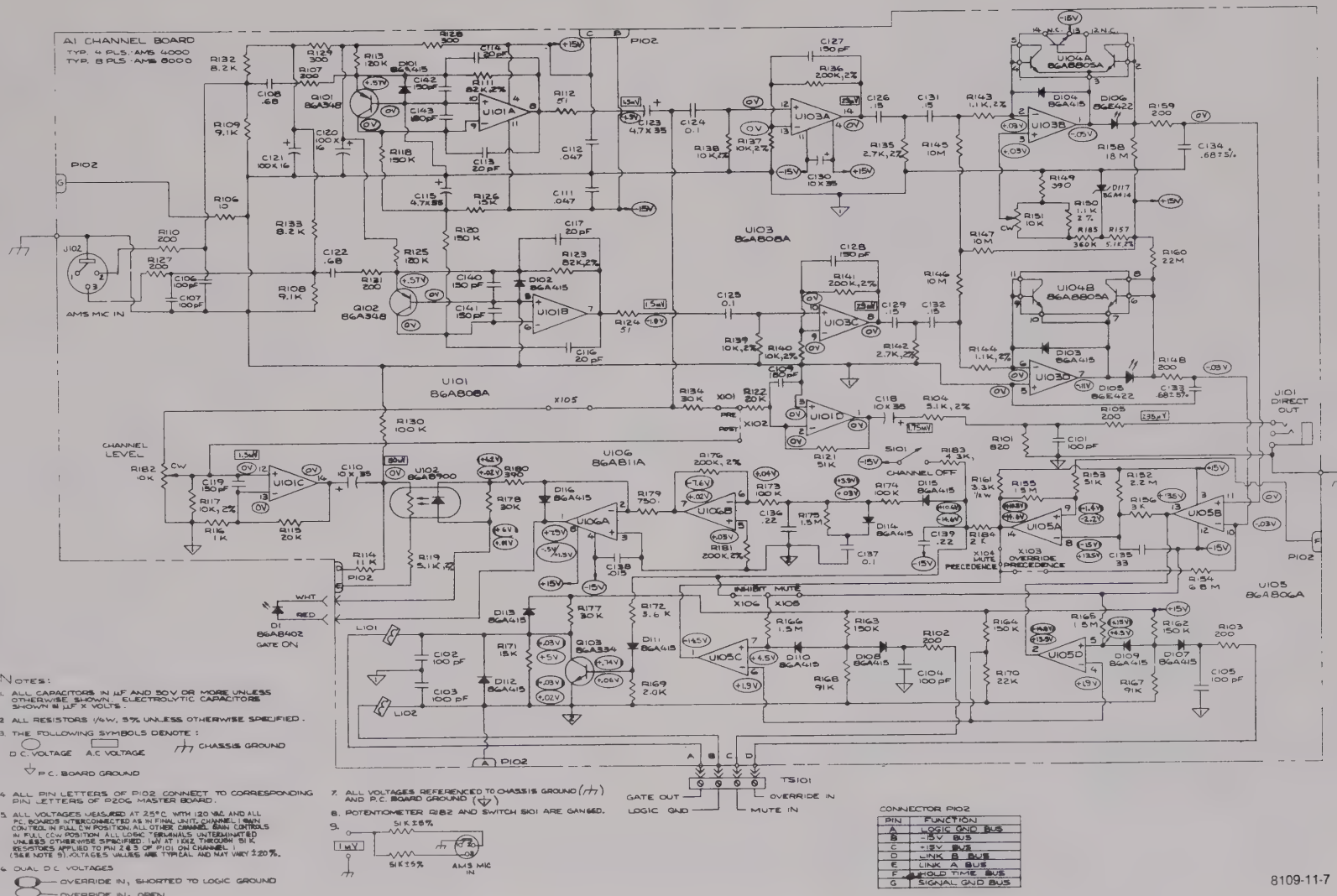


NOTES:

1. FOR THE REMAINDER OF SCHEMATIC SEE INDIVIDUAL PRINTED CIRCUIT BOARD SCHEMATICS.
2. BUS W1 IS A DAISY CHAIN CABLE ASSEMBLY WHICH CONNECTS ALL CHANNEL BOARDS A1 AND MASTER BOARD A2.

8026-11-7

AMS4000 WIRING DIAGRAM
(LATER PRODUCTION)



NOTES:

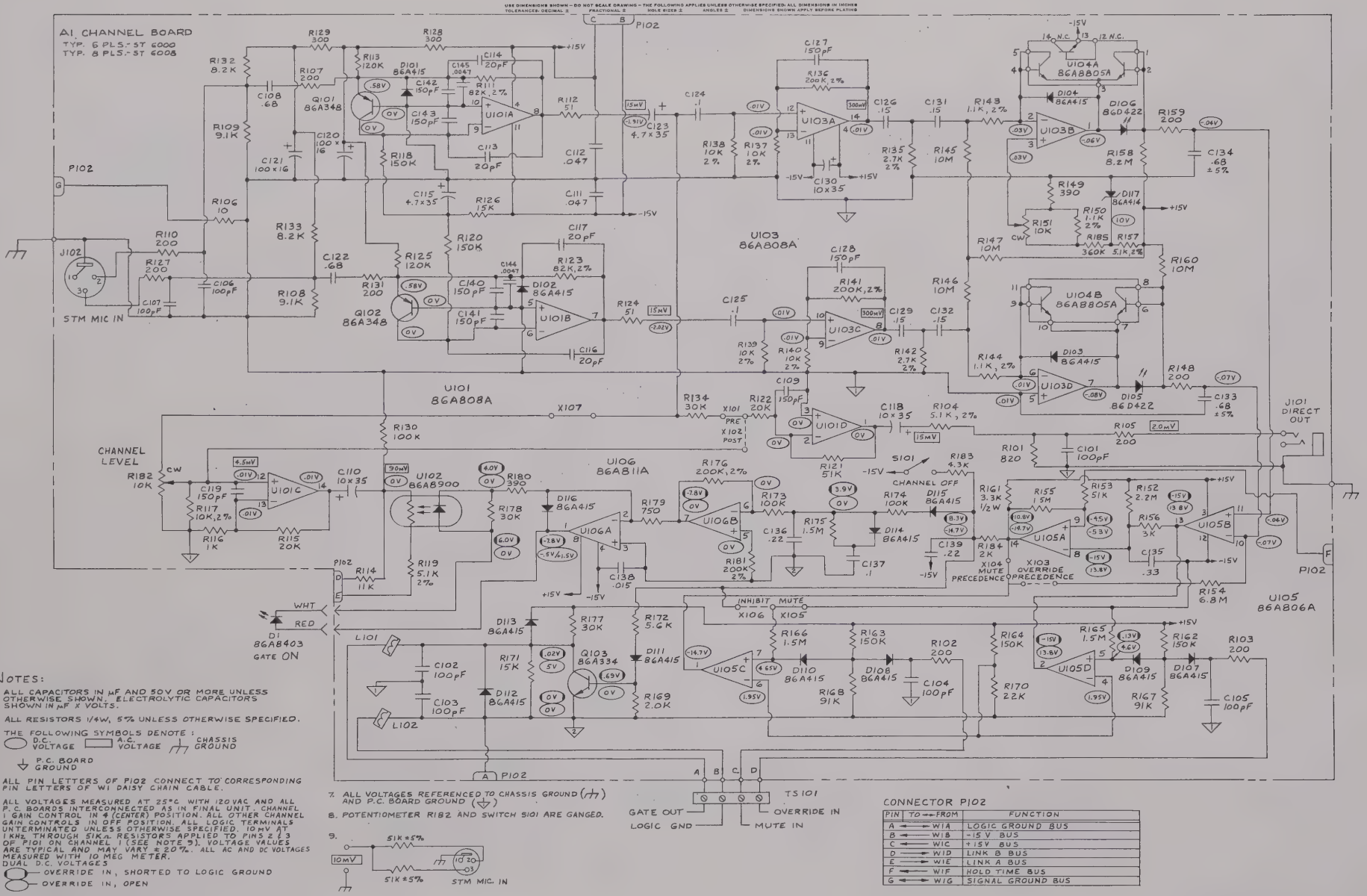
1. ALL CAPACITORS IN µF AND 50V OR MORE UNLESS OTHERWISE SHOWN. ELECTROLYTIC CAPACITORS SHOWN IN µF X VOLTS.
2. ALL RESISTORS 1/4W, 5% UNLESS OTHERWISE SPECIFIED.
3. THE FOLLOWING SYMBOLS DENOTE:
   - ○ D.C. VOLTAGE
   - □ A.C. VOLTAGE
   - ⏚ CHASSIS GROUND
   - ▽ P.C. BOARD GROUND
4. ALL PIN LETTERS OF P102 CONNECT TO CORRESPONDING PIN LETTERS OF P206 MASTER BOARD.
5. ALL VOLTAGES MEASURED AT 25°C WITH 120 VAC AND ALL P.C. BOARDS INTERCONNECTED AS IN FINAL UNIT. CHANNEL 1 GAIN CONTROL IN FULL CW POSITION. ALL OTHER CHANNEL GAIN CONTROLS IN FULL CCW POSITION. ALL LOGIC TERMINALS UNTERMINATED UNLESS OTHERWISE SPECIFIED. 1 kHz AT 1 kHz THROUGH 51K RESISTORS APPLIED TO PIN 2 & 3 OF P101 ON CHANNEL 1 (SEE NOTE 9). VOLTAGES VALUES ARE TYPICAL AND MAY VARY ±20%.
6. DUAL D.C. VOLTAGES
   - 8 — OVERRIDE IN, SHORTED TO LOGIC GROUND
   - 8 — OVERRIDE IN, OPEN
7. ALL VOLTAGES REFERENCED TO CHASSIS GROUND (⏚) AND P.C. BOARD GROUND (▽)
8. POTENTIOMETER R182 AND SWITCH S101 ARE GANGED.
9. 51K ±5% — 1 mV — 51K ±5% — AMS MIC IN

CONNECTOR P102

PIN	FUNCTION
A	LOGIC GND BUS
B	−15V BUS
C	+15V BUS
D	LINK B BUS
E	LINK A BUS
F	HOLD TIME BUS
G	SIGNAL GND BUS

8109-11-7

CHANNEL BOARD A1
(EARLY PRODUCTION)



NOTES:

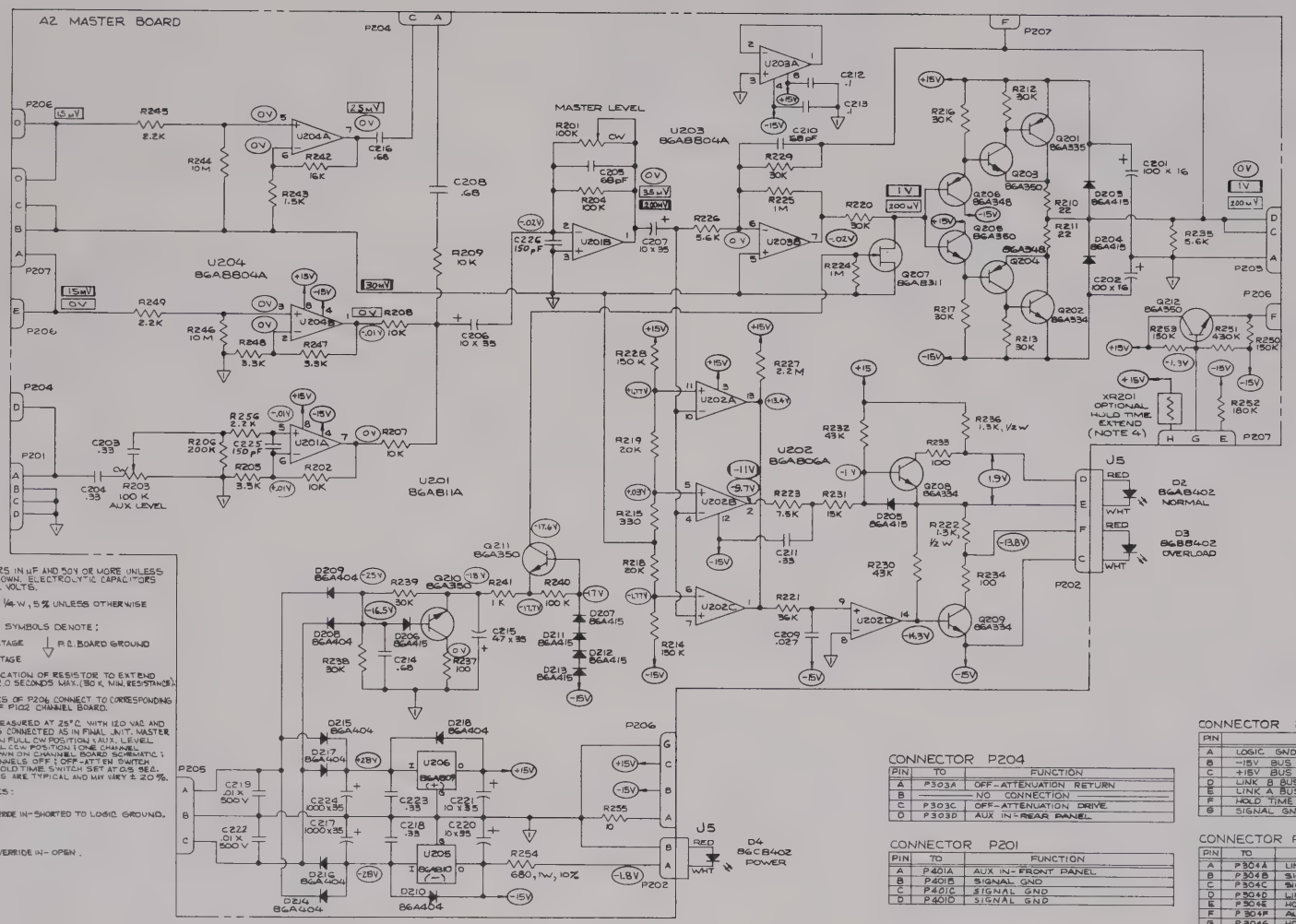
1. ALL CAPACITORS IN μF AND 50V OR MORE UNLESS OTHERWISE SHOWN. ELECTROLYTIC CAPACITORS SHOWN IN μF X VOLTS.
2. ALL RESISTORS 1/4W, 5% UNLESS OTHERWISE SPECIFIED.
3. THE FOLLOWING SYMBOLS DENOTE: D.C. VOLTAGE, A.C. VOLTAGE, CHASSIS GROUND, P.C. BOARD GROUND
4. ALL PIN LETTERS OF P102 CONNECT TO CORRESPONDING PIN LETTERS OF W1 DAISY CHAIN CABLE.
5. ALL VOLTAGES MEASURED AT 25°C WITH 120 VAC AND ALL P.C. BOARDS INTERCONNECTED AS IN FINAL UNIT. CHANNEL 1 GAIN CONTROL IN 4 (CENTER) POSITION. ALL OTHER CHANNEL GAIN CONTROLS IN OFF POSITION. ALL LOGIC TERMINALS UNTERMINATED UNLESS OTHERWISE SPECIFIED. 10 mV AT 1 KHz THROUGH 51K Ω RESISTORS APPLIED TO PINS 2 & 3 OF P101 ON CHANNEL 1 (SEE NOTE 9). VOLTAGE VALUES ARE TYPICAL AND MAY VARY ± 20%. ALL AC AND DC VOLTAGES MEASURED WITH 10 MEG METER.
6. DUAL D.C. VOLTAGES: OVERRIDE IN, SHORTED TO LOGIC GROUND; OVERRIDE IN, OPEN
7. ALL VOLTAGES REFERENCED TO CHASSIS GROUND (⏚) AND P.C. BOARD GROUND (⏚).
8. POTENTIOMETER R182 AND SWITCH S101 ARE GANGED.
9. 10 mV, 51K ±5%, 51K ±5%, STM MIC. IN

CONNECTOR P102

PIN	TO ⟷ FROM	FUNCTION
A	W1A	LOGIC GROUND BUS
B	W1B	-15 V BUS
C	W1C	+15V BUS
D	W1D	LINK B BUS
E	W1E	LINK A BUS
F	W1F	HOLD TIME BUS
G	W1G	SIGNAL GROUND BUS

B8109-11-3

CHANNEL BOARD A1
(LATER PRODUCTION)



NOTES:

1. ALL CAPACITORS IN µF AND 50V OR MORE UNLESS OTHERWISE SHOWN. ELECTROLYTIC CAPACITORS SHOWN IN µF X VOLTS.
2. ALL RESISTORS ¼ W, 5% UNLESS OTHERWISE SPECIFIED.
3. THE FOLLOWING SYMBOLS DENOTE:
   - D.C. VOLTAGE
   - P.C. BOARD GROUND
   - A.C. VOLTAGE
4. XR201 FOR LOCATION OF RESISTOR TO EXTEND HOLD TIME TO 2.0 SECONDS MAX. (30 K MIN. RESISTANCE).
5. ALL PIN LETTERS OF P206 CONNECT TO CORRESPONDING PIN LETTERS OF P102 CHANNEL BOARD.
6. ALL VOLTAGES MEASURED AT 25°C WITH 120 VAC AND ALL P.C. BOARDS CONNECTED AS IN FINAL UNIT. MASTER GAIN CONTROL IN FULL CW POSITION & AUX. LEVEL CONTROL IN FULL CCW POSITION (ONE CHANNEL DRIVEN AS SHOWN ON CHANNEL BOARD SCHEMATIC; ALL OTHER CHANNELS OFF) OFF-ATTEN SWITCH SET AT -5 & HOLD TIME SWITCH SET AT 0.5 SEC. VOLTAGE VALUES ARE TYPICAL AND MAY VARY ± 20%.
7. DUAL VOLTAGES:
   - OVERRIDE IN - SHORTED TO LOGIC GROUND.
   - OVERRIDE IN - OPEN.

8187-11-4

CONNECTOR P205

PIN	TO	FUNCTION
A	S1 RED	XFMR SUPPLY A.C.
B	T1 RED/YEL	MAIN SUPPLY GND
C	S1 RED	XFMR SUPPLY A.C.

CONNECTOR P203

PIN	TO	FUNCTION
A	T2 RED	SIGNAL GND
B	——— NO CONNECTION ———	
C	A4 PIN A	AUX & HEADPHONE OUT
D	T2 BLU	MIC/LINE OUT

CONNECTOR P204

PIN	TO	FUNCTION
A	P303A	OFF-ATTENUATION RETURN
B	——— NO CONNECTION ———	
C	P303C	OFF-ATTENUATION DRIVE
D	P303D	AUX IN-REAR PANEL

CONNECTOR P201

PIN	TO	FUNCTION
A	P401A	AUX IN-FRONT PANEL
B	P401B	SIGNAL GND
C	P401C	SIGNAL GND
D	P401D	SIGNAL GND

CONNECTOR P202

PIN	TO	FUNCTION
A	D4 WHT	POWER INDICATOR CATHODE
B	D4 RED	POWER INDICATOR ANODE
C	D3 WHT	OVERLOAD INDICATOR CATHODE
D	D2 RED	NORMAL INDICATOR ANODE
E	D2 WHT	NORMAL INDICATOR CATHODE
F	D3 RED	OVERLOAD INDICATOR ANODE

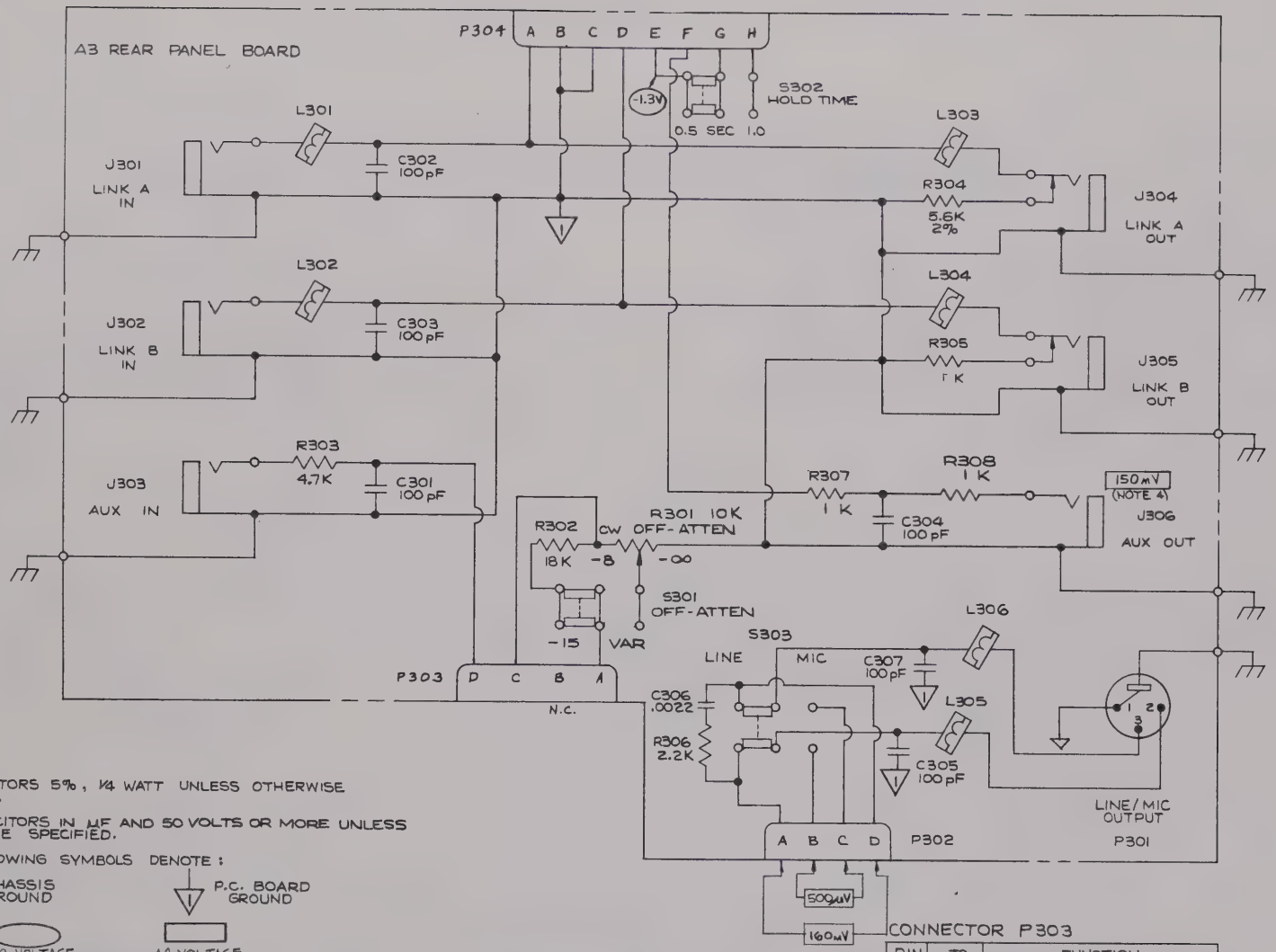
CONNECTOR P206

PIN	FUNCTION
A	LOGIC GND BUS
B	-15V BUS
C	+15V BUS
D	LINK B BUS
E	LINK A BUS
F	HOLD TIME BUS
G	SIGNAL GND BUS

CONNECTOR P207

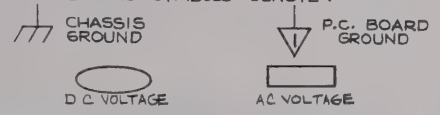
PIN	TO	FUNCTION
A	P304A	LINK A
B	P304B	SIGNAL GND
C	P304C	SIGNAL GND
D	P304D	LINK B
E	P304E	HOLD TIME SW (.5 SEC.)
F	P304F	AUX & HEADPHONE OUT
G	P304G	HOLD TIME SW RETURN
H	P304H	HOLD TIME SW (1 SEC.)

MASTER BOARD A2



NOTES :

1. ALL RESISTORS 5%, 1/4 WATT UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITORS IN μF AND 50 VOLTS OR MORE UNLESS OTHERWISE SPECIFIED.
3. THE FOLLOWING SYMBOLS DENOTE :



4. ALL VOLTAGES MEASURED AT 25° C. WITH 120 VAC AND ALL P.C. BOARDS INTERCONNECTED AS IN FINAL UNIT. VOLTAGE MEASUREMENTS MAY VARY ±20% FROM VALUES SHOWN
5. VOLTAGE SHOWN AT AUXILIARY OUTPUT IS WHEN THE OUTPUT IS LOADED WITH 51 K. OHMS.
6. D.C. MEASUREMENTS MADE USING A VOLTMETER WITH 11 MEGOHM OR GREATER INPUT IMPEDANCE.

8111-11-2

CONNECTOR P304

PIN	TO	FUNCTION
A	P207A	LINK A
B	P207B	SIGNAL GND
C	P207C	SIGNAL GND
D	P207D	LINK B
E	P207E	HOLD TIME SW (0.5 SEC.)
F	P207F	AUX & HEADPHONE OUT
G	P207G	HOLD TIME SW RETURN
H	P207H	HOLD TIME SW (1 SEC.)

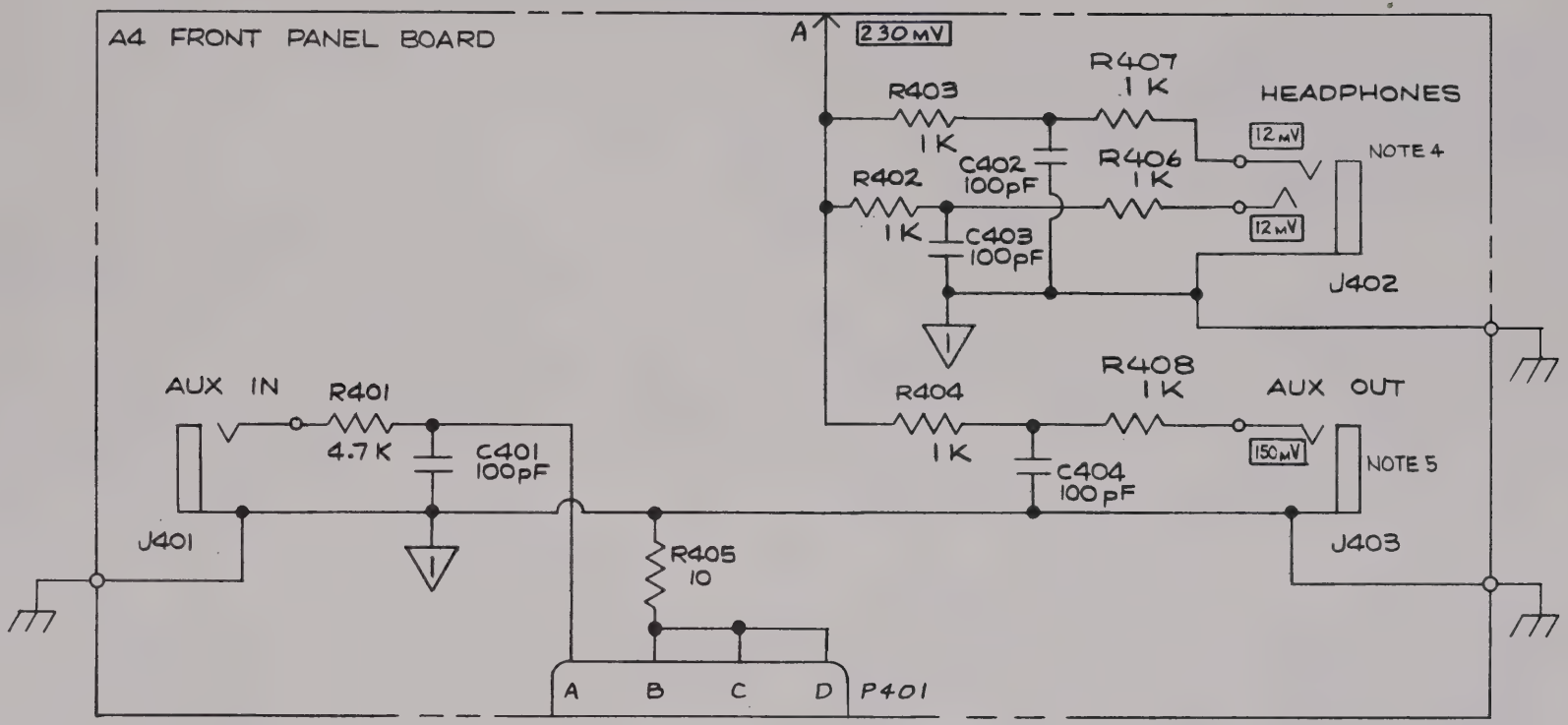
CONNECTOR P303

PIN	TO	FUNCTION
A	P204A	OFF-ATTENUATION RETURN
B	NO CONNECTION	
C	P204C	OFF-ATTENUATION DRIVE
D	P204D	AUX IN (REAR PANEL)

CONNECTOR P302

PIN	TO	FUNCTION
A	T2 WHT	LINE OUTPUT XFMR FINISH
B	T2 BRN	MIC OUTPUT XFMR FINISH
C	T2 YEL	MIC OUTPUT XFMR START
D	T2 GRN	LINE OUTPUT XFMR START

REAR PANEL BOARD A3



NOTES:

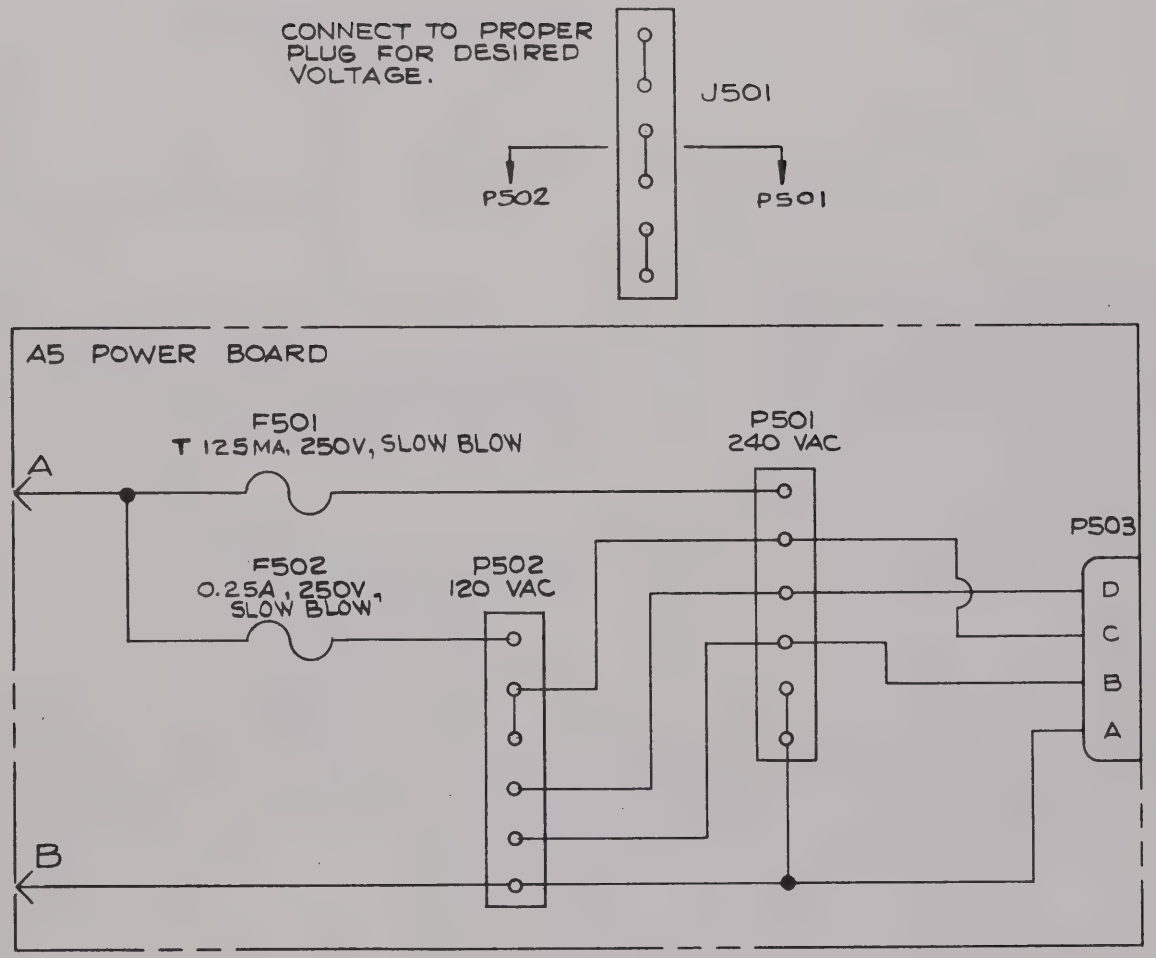
1. ALL RESISTORS 5%, 1/4 WATT UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITORS 50 VOLTS OR MORE UNLESS OTHERWISE SPECIFIED.
3. THE FOLLOWING SYMBOLS DENOTE:
   - CHASSIS GROUND
   - CIRCUIT BOARD GROUND
   - AC VOLTAGE
4. VOLTAGE SHOWN IS WHEN THE OUTPUT IS LOADED WITH 200 OHMS.
5. VOLTAGE SHOWN IS WHEN THE OUTPUT IS LOADED WITH 51 K OHMS.
6. ALL VOLTAGES MEASURED AT 25° C WITH 120 VAC AND ALL P.C. BOARDS INTERCONNECTED AS IN FINAL UNIT. VOLTAGE MEASUREMENTS MAY VARY ± 20 % FROM VALUES SHOWN.
7. D.C. VOLTAGE IS ZERO AT ALL POINTS.

CONNECTOR P401

PIN NO.	TO	FUNCTION
A	P201A	AUX INPUT
B	P201B	SIGNAL GROUND
C	P201C	SIGNAL GROUND
D	P201D	SIGNAL GROUND

FRONT PANEL BOARD A4

8186-11-2



NOTES:

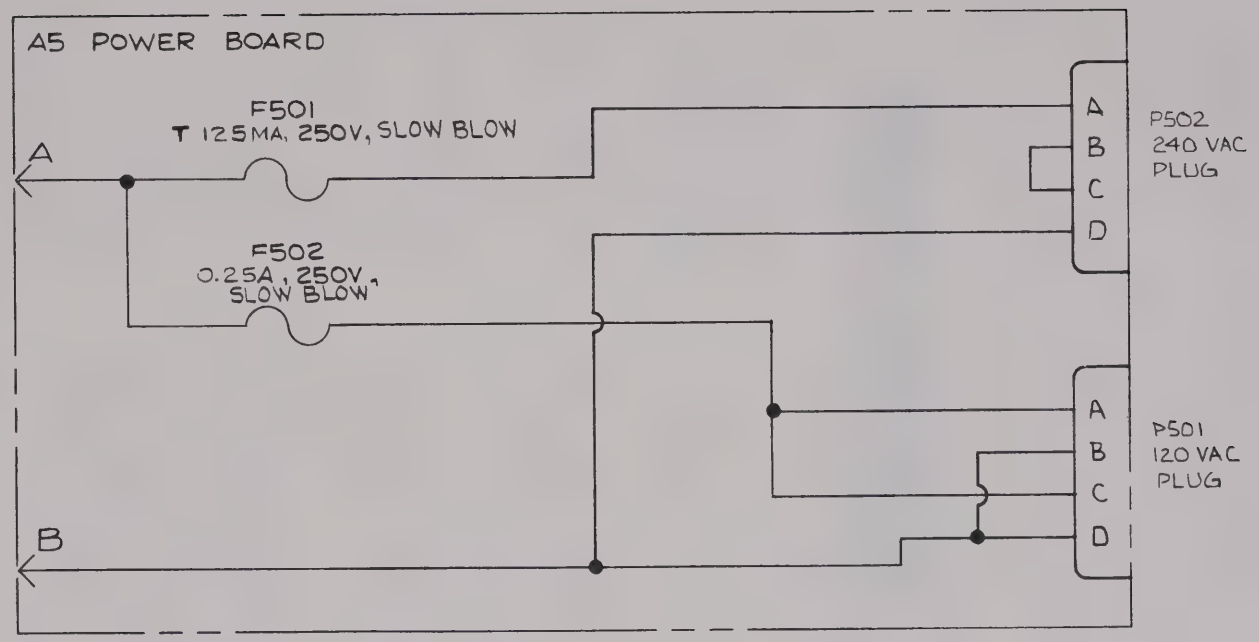
1. PINS A & B CONNECT TO LINE CORD.

CONNECTOR P503

PIN NO.	TO	FUNCTION
A	T1-BLK	TRANSFORMER PRIMARY 1 START
B	T1-BLK/WHT	TRANSFORMER PRIMARY 2 START
C	T1-BLK/GRN	TRANSFORMER PRIMARY 2 FINISH
D	T1-BLK/RED	TRANSFORMER PRIMARY 1 FINISH

POWER BOARD A5
(EARLY PRODUCTION)

8113-11-2



NOTES:

1. PINS A & B CONNECT TO LINE CORD.

POWER BOARD A5
(LATER PRODUCTION)

8256-11-3

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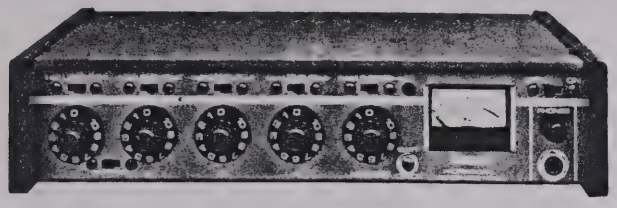
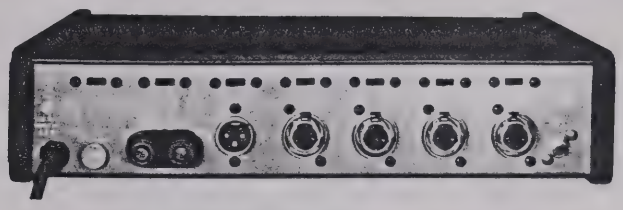
PROFESSIONAL PRODUCTS





GENERAL

The Shure Model M267 is a microphone mixer-remote amplifier specifically designed for professional applications. The excellent performance, versatility and features of this complete, compact console make it an ideal choice for studio, remote, or sound reinforcement use, and as an add-on mixer for expanding existing facilities. It is also ideally suited for use with audio and video tape recorders to provide multiple microphone inputs.

Features:

- Wide, flat frequency response and extremely low distortion up to +18 dBm output
- Extremely low noise and RF susceptibility
- Four switchable microphone- or line-level balanced-line inputs with individual gain controls and low-frequency rolloff switches. MUMETAL shielding on input transformers
- Feedback-type input gain controls for maximum clipping levels and dynamic range
- Output switchable for line or microphone level
- Built-in switchable peak limiter cuts output overload distortion, adapts to power supply voltage
- LED indicator shows limiter operation or overload with limiter defeated
- Externally adjustable limiter threshold (−4 to +18 dBm)
- VU meter calibrated for +4 and +8 dBm with range switch. Illuminated with ac operation
- Phantom power for condenser microphone operation
- Ac or built-in battery operation. Noiseless automatic switchover to battery in case of ac line failure. Battery test without program interruption
- Front-panel headphone level control and monitor jack drives almost any stereo or mono headphones; output can be additional unbalanced line feed to drive a tape recorder or power amplifier.
- Direct mix bus for stacking units
- Automatic muting prevents speaker damage during turn-on and -off
- Low-distortion, high-stability tone oscillator for line test and level checks
- All connections phased. Line output terminals phase-indicated
- Compact and lightweight, with rugged, abrasion-resistant case
- Internally selectable 120 or 240 Vac, 50/60 Hz operation
- Underwriters' Laboratories Listed and Canadian Standards Association listed as Certified

SPECIFICATIONS

Frequency Response
30 to 20,000 Hz, ±2 dB

Voltage Gain (at 1,000 Hz)
(Outputs terminated: line 600 ohms, microphone 150 ohms, mix bus 3.3k, headphone 200 ohms, tip-sleeve and ring-sleeve)

INPUT	OUTPUT		
	Line	Microphone	Mix Bus
Low Impedance Microphone (150 ohms)	91 dB	41 dB	24 dB
Line	40 dB	− 9 dB	−27 dB
Mix Bus	55 dB	5 dB	− −

Inputs

Input	IMPEDANCE		Input Clipping Level
	Designed for Use With	Actual (Internal)	
Microphone	19-600 ohms	1 kilohm	−32 dBV to −5 dBV* (25 mV to 0.56V)
Line	Less than 10 kilohms	66 kilohms	+20 dBV
Mix Bus	3.5 kilohms	3.5 kilohms	+ 7 dBV (2.2V)

*Depending on input control setting.

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Outputs

Output	IMPEDANCE		Output Clipping Level
	Designed for Use With	Actual (Internal)	
Microphone	Any low impedance microphone input	0.5 ohms	−34 dBV (20 mV)
Mix Bus	3.5 kilohms	3.5 kilohms	−8 dBV (400 mV)
Headphones	8 - 2000 ohms, 200 ohms recommended	400 ohms to 3 kilohms**	+10 dBV (3.3V)
Line	600-ohm	150 ohm	+18 dBm (6.2V)

**Depending on level control setting.

Noise

Equivalent input noise: −128.5 dBV (low-impedance microphone, 150 ohms −300-20,000 Hz) into 600-ohm load at full gain

Equivalent input hum and noise: −126 dBV (low-impedance microphone, 150 ohms −20-20,000 Hz) into 600-ohm load at full gain

Output noise: −75 dBV (master control full counterclockwise), −53 dBV (master full clockwise) (input controls down; 300-20,000 Hz)

Output hum and noise: −70 dBV (master control down), −51 dBV (master control up) (input controls down; 20-20,000 Hz)

Distortion

0.35% or less THD from 30 to 20,000 Hz at +15 dBm output; 0.5% or less IM distortion up to +15 dBm output level

Common-Mode Rejection

65 dB minimum with input of −20 dBV at 100 Hz

Control Interaction

Less than 1 dB with any control combination

Overload and Shorting Protection

Shorting the outputs, even for prolonged periods, will cause no damage; microphone inputs will not be damaged by signals up to 3 volts

Lo-Cut Filters

6 dB/octave rolloff at 150 Hz

Limiter

Threshold: +15 dBm (line output level; adjustable from −4 to +18 dBm)
Attack Time: 3 msec typical
Recovery Time: 500 msec typical

Peak Indicator

Lights 6 dB below clipping or at onset of limiter action

Headphone Output Clipping Level

3.16V (+10 dBV) into 200 ohms

Tone Oscillator

1,000 Hz, 1.5% or less THD

Phantom Power

30 Vdç open-circuit, 3.3K series resistance, input switches in MIC position only

Operating Voltage

Ac Operation: 120 or 240 volts ±10%, 50/60 Hz, 9.5W, internally switchable †
Dc Operation: 27 volts nominal at 15 mA typical no-signal, 18 mA typical at 0 VU (+4 dBm) output with headphone load; 21.5 volts minimum; battery life approximately 20 hours with alkaline batteries at +4 dBm output in continuous use; three 9-volt batteries, type NEDA 1604A (Duracell MN1604 or Eveready 522 recommended)
External Power: 30 Vdc, 16 mA no-signal, 19 mA at 0 VU (+4 dBm) output with headphone load

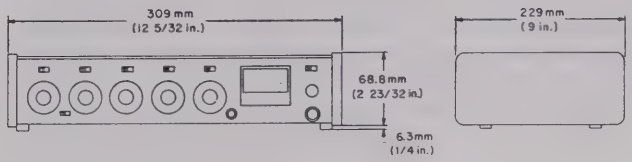
† Supplied wired for 120 Vac operation (see Service section for 240 Vac operation).

Temperature Range

Operating: −18° to 57°C (0° to 135°F)
Storage: −29° to 71°C (−20° to 160°F)

Dimensions

See Figure 1



OVERALL DIMENSIONS
FIGURE 1

Weight

Net: 2.3 kg (5 lb 2 oz)
Packaged: 3.2 kg (7 lb 2 oz)

Certifications

Listed by Underwriters Laboratories, Inc.; listed by Canadian Standards Association as Certified

CONTROLS AND CONNECTORS

WARNING

This apparatus must be earthed (grounded)! The M267 Power Supply is energized when the unit is connected to an ac source; disconnect mains (power) plug from supply socket when not in use.

Inputs

The four inputs are professional three-pin female XLR audio connectors located on the rear panel and designated INPUT 1 through INPUT 4. The inputs are balanced (internal transformer, MUMETAL shielded); pins 2 and 3 are "hot," and pin 1 is "ground." For microphone operation, the switches labeled LINE/MIC (directly above the input connectors) must be in the MIC position; for line level inputs, the switches must be in the LINE position. For impedance, clipping and operating signal levels, refer to the SPECIFICATIONS section.

Outputs

The rear-panel connector labeled OUTPUT is a professional three-pin male XLR audio connector. With the adjacent LINE/MIC switch in the MIC position, the OUTPUT connector is used to feed a low-impedance microphone line or a low-impedance microphone input. With the LINE/MIC switch in the LINE position, the OUTPUT connector feeds the line-level input of an amplifier, tape recorder, or another mixer. The OUTPUT connector is a balanced output with the LINE/MIC switch in either position; pin 1 is ground, pins 2 and 3 are "hot," and the connector is in phase with the corresponding pins of the input connectors.

The rear-panel binding-post connector designated LINE OUTPUT is in parallel with the OUTPUT connector and can be used as a line-level output feed simultaneously with the OUTPUT connector. The terminals are numbered 2 and 3 and are in phase with the corresponding pins of the input connectors. The adjacent ground terminal corresponds to pin 1. While the line outputs can be used to drive various impedance lines, the VU meter is calibrated for use with a 600-ohm line.

The line output transformer will operate properly with up to 100 mA dc in the line. This feature permits the use of standard "dialed-up" telephone lines with dc across them. (Since a slight distortion increase may occur at high output levels with maximum dc current, operation with the VU RANGE switch at +4 dBm is recommended.)

Input Gain Controls

The front-panel controls designated 1 through 4 are the individual active gain controls for correspondingly numbered inputs. Note that the input connectors are located on the rear panel directly behind their corresponding gain control. The controls set the preamplifier gain and provide preamplifier output attenuation. As the gain is reduced, the preamplifier input clipping level is increased for that channel.

Input Control 1 serves an additional function as the level control for the tone oscillator when the INPUT 1/OSC 1 switch is in the OSC 1 position.

IMPORTANT: For optimum signal-to-noise ratio, the individual input controls should be operated at as high a setting as possible, consistent with maintaining adequate control range and input clipping level.

Master Gain Control

The front-panel control designated MASTER is the master gain control which sets the overall output level of the mixed sources (including signals applied to the MIX BUS input).

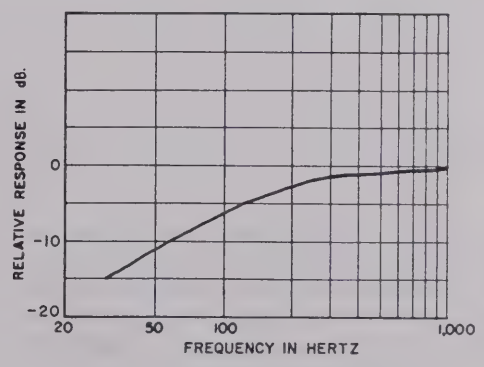
Limiter

The front-panel LIMITER IN/OUT switch turns on a fast-acting, peak-responding limiter circuit that cuts overload distortion during loud program intervals without affecting normal program levels. When the LIMITER switch is IN (operating), the mixer output is limited to approximately +15 dBm. Increasing the individual or MASTER gain controls will increase the average output and the amount of limiting. The limiter threshold can be reset to any other output between −4 and +18 dBm if desired. With the limiter switched OUT and the tone oscillator activated, adjust INPUT 1 and MASTER level controls to produce an output 0.5 dB higher than desired. Switch the limiter IN and set the LIMITER THRESHOLD ADJUST control (accessible through the bottom of the chassis) for the desired level.

The front-panel PEAK LED indicator shows limiter operation with the limiter in, and operates when program levels approach overload with the limiter out. The indicator is much faster than a meter and will be activated by the shortest transient peak, but it remains on long enough to provide easy recognition.

LO-Cut Filters

The lo-cut filters provide a low-frequency rolloff to the response curve as shown in Figure 2. The filters are activated by the LO-CUT IN/OUT switch above each individual input gain control and can be used individually with each control to reduce wind noise or undesirable low-frequency signals such as from condenser microphones or turntable rumble.



LO-CUT FILTER ACTION
FIGURE 2

Mix Bus

Direct access to the mixing bus is provided through the rear-panel MIX BUS phono pin jack. This provision is made primarily to facilitate stacking or "multing" M267's to achieve additional input capacity without losing any inputs. With two M267's, for example, the two mixing buses are directly connected, providing two in-

dependent master gain controls and two isolated line amplifiers with eight individually controlled inputs. Since the buses are directly paralleled, a 6 dB drop in gain will occur; and the master or input controls must be increased to compensate. Noise specifications are not adversely affected by this interconnection. Mix bus interconnection can also be made with other Shure mixers, such as the M268, FP42, etc.

VU Meter

The VU meter is factory-calibrated for use with a 600-ohm terminated line. The VU RANGE switch on the rear panel selects either a +4 or +8 dBm output at 0 VU meter indication. (This switch changes the meter indication but does not change the actual output level.) Microphone output levels are 50 dB below line output. The +4 range is recommended for normal use to provide approximately 14 dB of headroom from operating level to clipping level.

The VU meter is illuminated by two No. 86 lamps operating well under their normal ratings for a life expectancy of greater than 10,000 hours. The lamps are only lit with ac operation. Consequently, the illumination serves as a visual alarm if the ac is interrupted and the unit has switched to battery.

The VU meter is connected on the primary side of the output transformer to assure protection from any dc level on a telephone line.

Headphones

The headphone output appears at the front-panel jack designated PHONES. The two-circuit phone jack will accommodate most stereo or mono headphones. The output level is sufficient to provide high volume for use in noisy environments.

Note that the headphone output level is high enough to use it as an auxiliary unbalanced line feed to drive a tape deck or a power amplifier.

The tip and ring connections of the headphone plug are in phase with pin 3 of all input and output connectors, and with the tip of the MIX BUS jack.

Tone Oscillator

The highly stable, low-distortion tone oscillator provides for line test and level checks. The oscillator is instantly activated by the front-panel INPUT 1/OSC 1 switch; its level can then be controlled by the INPUT 1 gain control on the front panel. The tone oscillator frequency is 1,000 Hz, and the signal appears on both the line and microphone outputs, as well as the headphone and mix bus connectors. The oscillator should be switched off (INPUT 1 position) when not in use.

Phantom Power

The rear-panel PHANTOM OFF/ON switch controls the application of phantom power for condenser microphones, such as the Shure SM81 and SM85, to all inputs. With the switch on and the rear-panel MIC/LINE switches in the MIC position, +30 Vdc is applied to pins 2 and 3 of each input connector. Series current-limiting resistance is 3.3 kilohms for each input. When using other condenser microphones with the M267, verify that the voltage and resistance requirements are compatible.

Note that the phantom power cannot normally be applied to the inputs with the MIC/LINE switches in the LINE position. If line-level condenser microphones, such as Shure's SM82, are to be operated on phantom power, contact the Shure Customer Services Department for information on modifying the M267 for this capability. **IMPORTANT:** Do *not* turn the PHANTOM switch on when using *unbalanced* low-impedance microphones; objectionable hum will result. Turn off the PHANTOM switch when condenser microphones are not being used.

Use only high-quality cable, as intermittent shorts between broken shield wires and balanced conductors will cause offensive noise transients in the system.

BATTERY OPERATION AND EXTERNAL POWERING

In addition to ac operation, the M267 can be operated from an internal battery pack or any well-filtered dc supply providing 30 Vdc. Current drain is typically 17 mA at +8 dBm output level and typically 15 mA at +4 dBm. Battery operation is recommended both for remote, on-location operation, and as an emergency backup source in case of failure of the ac power.

Access to the battery compartment is provided at the bottom of the chassis. Three 9-volt transistor radio batteries power the M267 at full rated output. Use alkaline batteries for maximum life. Duracell MN1604 or Eveready 522 are recommended. Battery life is approximately 20 hours at +4 dBm continuous use. Note that battery operation with phantom power loads and high level headphone monitoring will increase battery drain.

With batteries in the battery compartment, the M267 will automatically and silently switch to battery operation should the ac voltage fall below a suitable level. If the ac power fails completely, the VU meter lamps will go out, providing a visual indication of line failure.

Battery condition can be determined by using the BATT CHECK switch on the front panel. Activate the BATT CHECK switch and observe the VU meter. A new set of batteries will give about a +2 VU indication. Battery condition is good if the reading is above 0 VU; a

lower reading means that new batteries are required for proper operation. Note that the M267 power switch must be turned on to check battery condition.

Telephone Interconnection

When using the M267 connected directly to a telephone line, check to see whether the telephone company requires an interface coupler between the M267 and the telephone line. If a coupler is required, make certain the coupler selected and the wiring arrangement are in compliance with local telephone company regulations.

When direct connection to a telephone line is not possible, acoustic coupling to a telephone handset may be used. A Shure Model 50AC Telephone Acoustic Coupler can be connected to the 600-ohm line or headphone output of the M267 and attached to most telephone handsets.

Telephone Line Surge Protection

When using the M267 connected directly to a telephone line subject to lightning-induced voltage surges, the following part (commercially available) can be installed across the LINE OUT terminals to provide additional protection for output circuit components: Metal Oxide Varistor, General Electric Co., Type No. V22ZA1.

ACCESSORIES

The Model A268R Rack Panel Kit consists of a 19 in. x 3-1/2 in. (483 mm x 89 mm) precut rack panel and necessary hardware for rack-mounting the M267 with its cover in place and end caps removed in a standard 19" (483 mm) rack panel.

The Model RKC169 Rack Panel Bracket Kit enables owners of the Shure A68R Rack Panel Kit (originally designed for the M67 and M68 Mixers) to rack-mount the M267 with the A68R.

SERVICE

WARNING

Voltages in this equipment are hazardous to life. Refer servicing to qualified service personnel.

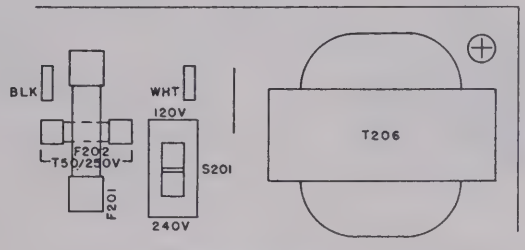
240 Vac Operation

To change the M267 operating voltage from 120 Vac to 240 Vac, follow these steps.

1. Disconnect the M267 from the ac line.
2. Remove the end caps and cover.
3. Locate the voltage selector switch (S201) at the right rear of the main printed circuit board (Figure 3). Move S201 to the 240V position (toward the front panel).
4. Remove fuse F201 (0.1A, 250V, time lag) and replace it with the supplied fuse F202 (0.05A, 250V, time lag). Note that the F202 fuseholder is at right angles to the F201 fuseholder.
5. Replace the ac line cord (if necessary) with one designed for the 240 Vac source. If the M267 is to be used outside the U.S. and Canada, local regulations may require replacing the line cord with one having wire insulation colors as follows:

	"Live" or "Hot"	Neutral	Earth or Ground
U.S., Canada	Black	White	Green
Europe	Brown	Blue	Green/Yellow

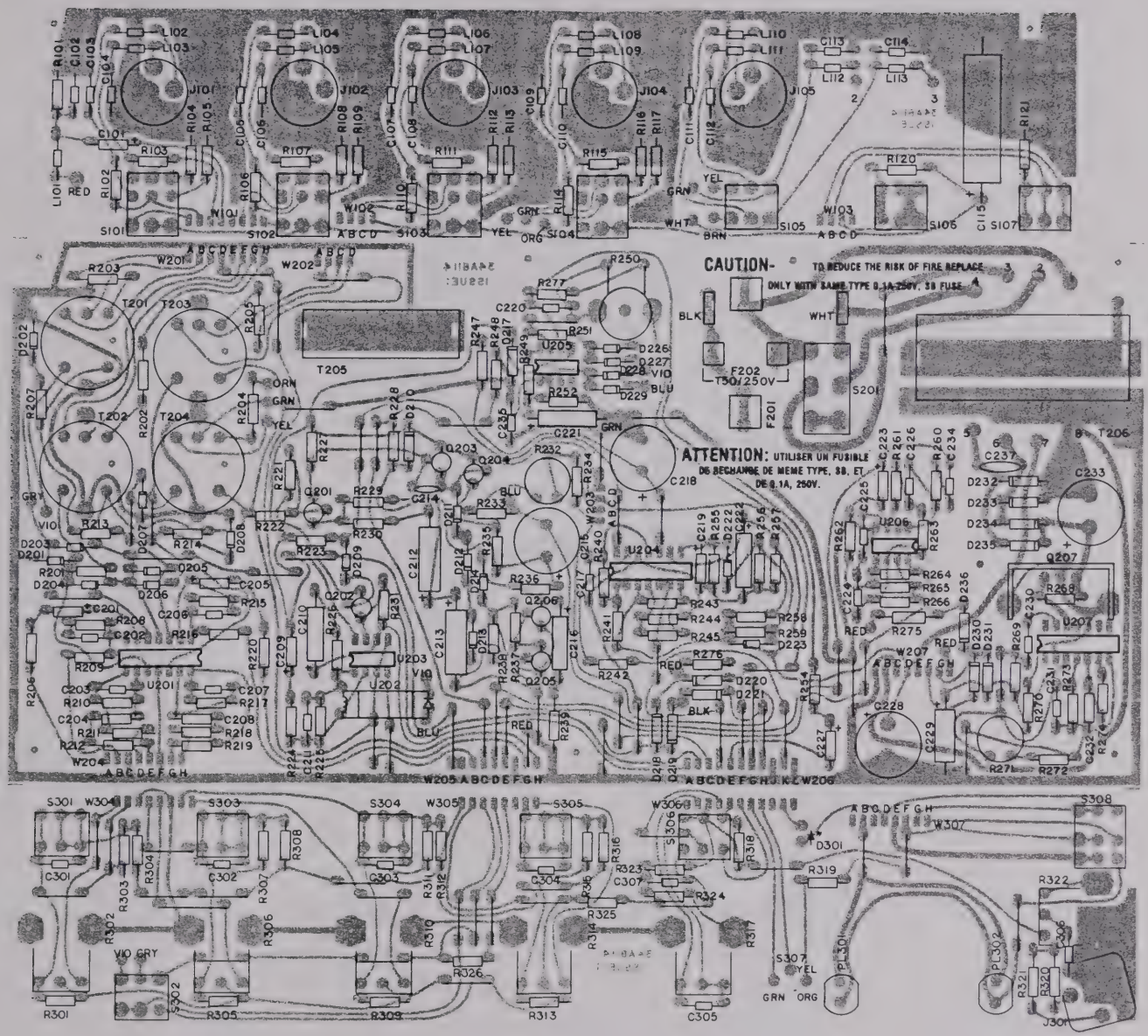
6. Replace the cover and end caps, and mark the rear panel to reflect the new operating voltage.



240V WIRING
FIGURE 3

PRINTED CIRCUIT BOARDS

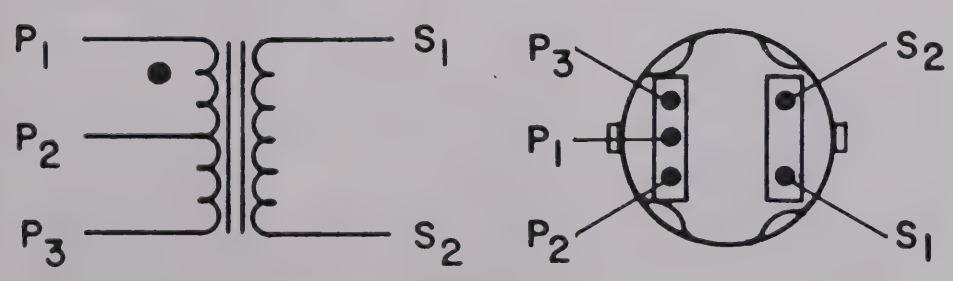
COMPONENT SIDE



8214-6/8114-3

INPUT TRANSFORMERS T201-T204

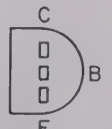
PRIMARY SECONDARY



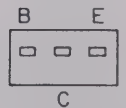
DC RESISTANCE (± 20%)

P_1 - P_3 75 OHMS
P_1 - P_2, P_2 - P_3 37.5 OHMS
S_1 - S_2 4300 OHMS

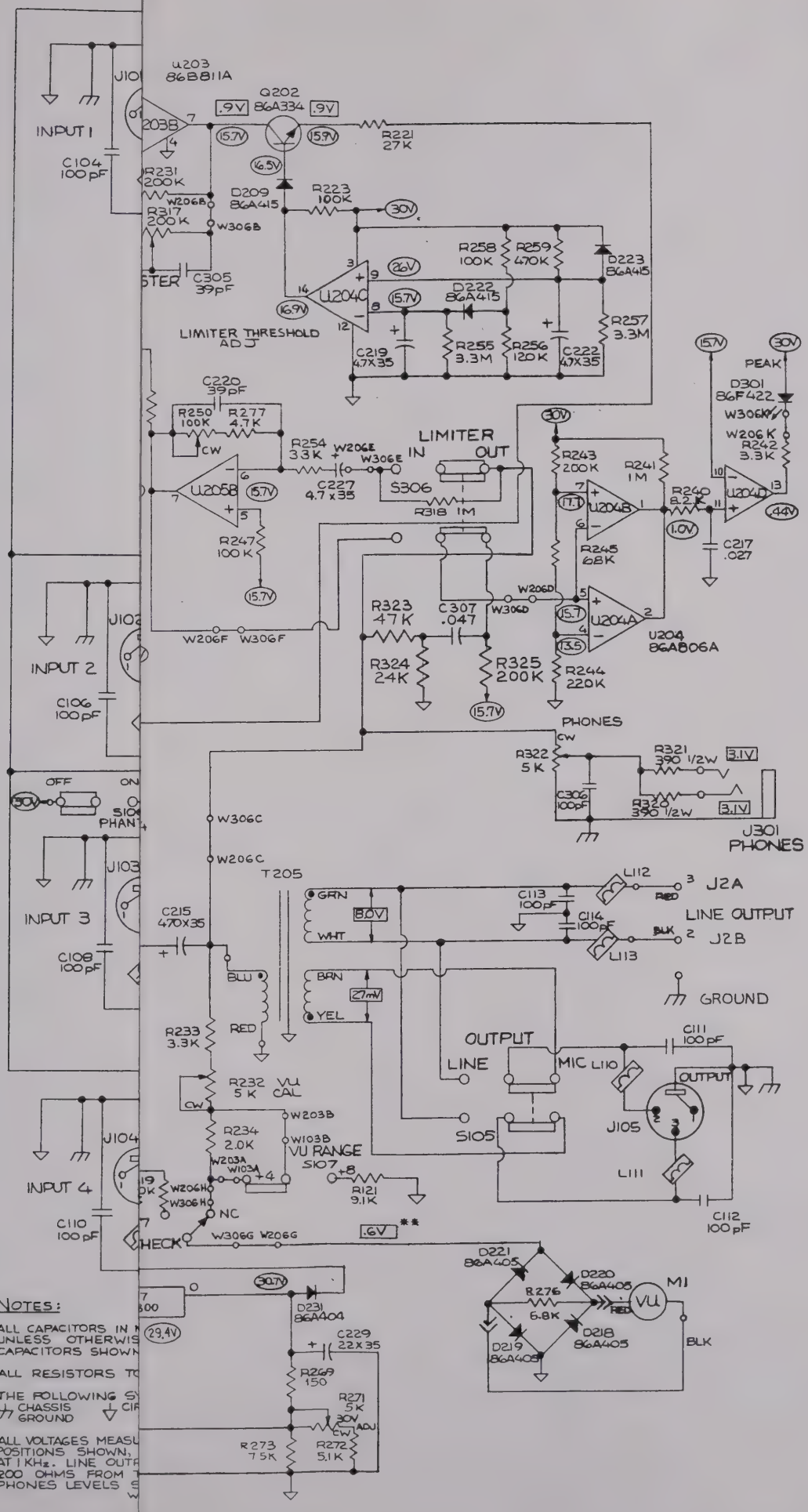
TRANSISTOR LEAD CODES



Q201 – Q206



Q207


U203
86B811A
Q202
86A334
INPUT 1
INPUT 2
INPUT 3
INPUT 4
C104
100 pF
R231
200K
R317
200K
C305
39pF
D209
86A415
R223
100K
R221
27K
U204C
R258
100K
R259
470K
D223
86A415
D222
86A415
R257
3.3M
R255
3.3M
R256
120K
C219
4.7X35
C222
4.7X35
LIMITER THRESHOLD ADJ
C220
39pF
R250
100K
R277
4.7K
CW
R254
3.3K
W206E
W306E
C227
4.7x35
U205B
R247
100K
LIMITER
IN
OUT
S306
R318 1M
R243
200K
R241
1M
U204B
R240
8.2K
U204D
R245
68K
D301
86F422
PEAK
W306K
W206K
R242
3.3K
C217
.027
W206D
W306D
R323
47K
C307
.047
U204A
U204
86A806A
R324
2.4K
R325
200K
R244
220K
W206F
W306F
PHONES
R322
5K
R321
390 1/2W
R320
390 1/2W
C306
100pF
J301
PHONES
OFF
ON
S104
PHANT
W306C
W206C
T205
GRN
WHT
8.0V
C215
470X35
C113
100pF
C114
100pF
L112
L113
J2A
J2B
LINE OUTPUT
BLU
RED
BRN
YEL
27mV
R233
3.3K
R232
5K
VU CAL
W203B
R234
2.0K
W103B
VU RANGE
S107
W203A
W103A
+4
+8
R121
9.1K
GROUND
OUTPUT
LINE
MIC
L110
S105
C111
100pF
J105
OUTPUT
L111
C112
100pF
W206H
W306H
NC
CHECK
W306G
W206G
.6V
D221
86A405
D220
86A405
R276
6.8K
M1
VU
D219
86A405
D218
86A405
BLK
D231
86A404
C229
22X35
R269
150
R271
5K
30V ADJ
R273
7.5K
R272
5.1K
NOTES:
1. ALL CAPACITORS IN M
UNLESS OTHERWIS
CAPACITORS SHOWN
2. ALL RESISTORS TO
3. THE FOLLOWING SY
CHASSIS GROUND
4. ALL VOLTAGES MEASU
POSITIONS SHOWN,
AT 1 KHz. LINE OUTP
200 OHMS FROM
PHONES LEVELS S

8059-11-14

USE DIMENSIONS SHOWN — DO NOT SCALE DRAWING — THE FOLLOWING APPLIES UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN INCHES. TOLERANCES: DECIMAL ± —— FRACTIONAL ± —— HOLE SIZES ± —— ANGLES ± —— DIMENSIONS SHOWN APPLY BEFORE PLATING.

INPUT 1 J101 C103 100pF C104 100pF L102 L103 R102 33K R103 33K MIC LINE W101A W201A W101B W201B W101C W201C T201 R203 3.3K 1/2W SI01 R104 100 R105 100 W205C W305C

INPUT 2 J102 C105 100pF C106 100pF L104 L105 R106 33K R107 33K MIC LINE W101H W201H W101G W201G W101F W201F T202 R202 3.3K 1/2W SI02 R108 100 R109 100 W205C W305C

INPUT 3 J103 C107 100pF C108 100pF L106 L107 R110 33K R111 33K MIC LINE W102D W202D W102C W202C W102B W202B T203 R205 3.3K 1/2W SI03 R112 100 R113 100 W205C W305C

INPUT 4 J104 C109 100pF C110 100pF L108 L109 R114 33K R115 33K MIC LINE GRN W204H GRN W204G YEL T204 R204 3.3K 1/2W SI04 R116 100 R117 100 W205C W305C

OFF ON R120 47 1/2W S106 PHANTOM C115 250x40

INPUT 1/OSC1 GRA S302 V10 R207 150K D203 BGA415 D202 BGA415 2.6mV 15.7V U201B R209 6.8K 85mV W204B W304B R208 47K C202 39pF C201 22x35 R206 1.5K W204A W304A CW R301 100K R302 100K INPUT 1 W305D W205D

LO CUT OUT IN S301 C301 .018 R303 330K R304 27K W305A W205A R224 9.1K U203A R225 56K C211 39pF C209 4.7x35 R226 5.1K 47mV C210 10x35 U203B 86B811A Q202 86A334 .9V R221 27K R231 200K MASTER C305 39pF W206A W306A W206B W306B R317 200K CW D209 BGA415 R223 100K 30V

U202 BGA8908 V10 BLU D226 BGA415 D227 BGA415 D229 BGA415 D228 BGA415

U204C R258 100K R259 470K D223 BGA415 D222 BGA415 R255 3.3K R256 120K C222 47x35 R257 3.3M C219 47x35 LIMITER THRESHOLD ADJ

R265 390K R264 100K R262 100K U206B R266 68K W305E W205E C226 .0047 R263 120K R261 120K U206A C225 330pF C224 .027 R260 13K C234 .047 R326 2.2K C223 1x25 MIX BUS 7.9mV

J1 L101 C102 100pF R101 27K C101 4.7x35 W201D W101D U206 BGA803

R249 91K U205A R252 100K R248 1K W205B W305B C221 22x35 C218 470x35 C235 .027 D217 BGA404 GRN

R251 3.3K R250 100K R277 4.7K CW R254 3.3K W206E W306E C227 4.7x35 U205B R247 100K S306 R318 1M LIMITER IN OUT

W206F W306F R323 47K C307 .047 W306D R324 2.4K R325 200K U204A R244 220K U204 BGA806A

R243 200K R241 1M R240 8.2 U204B R245 68K C217 .027 PEAK D301 BGF422 W306K W206K R242 3.3K U204D C217 .027

PHONES CW R322 5K C306 100pF R321 390 1/2W 3.1V R320 390 1/2W 3.1V J301 PHONES

LO CUT OUT IN S303 C302 .018 R308 27K R307 330K W204D W304D U201C R211 6.8K R210 47K C203 39pF C204 22x35 R212 1.5K W204E W304E R305 100K R306 100K INPUT 2

LO CUT OUT IN S304 C303 .018 R312 27K R311 330K W204G W304G U201D R219 6.8K R217 47K C207 39pF C208 22x35 R218 1.5K W204H W304H R309 100K R310 100K INPUT 3

LO CUT OUT IN S305 C304 .018 R316 27K R315 330K W205G U201A R216 6.8K R215 47K C206 39pF C205 22x35 R220 1.5K W205H W305H R313 100K R314 100K INPUT 4

W204E W4 W304C W204F W4 W304F

W101E W1 W201E W102A W2 W202A W103D W3 W203D W305F W5 W205F W306J W6 W206J W306L W6 W206L W307A W7 W207A W307C W7 W207C

REC W207H W307H BT1 BT2 BT3 3 9 VOLT BATTERIES OFF W307F W207F ON S308 W307D W207D D230 BGA404 C228 1000x35 W307G W207G BLK

F201 .1A SLO-BLO F202 .05A SLO-BLO NOTE 5 120V BLK W4 GRN WHT 105-125 VAC 50/60 Hz 240V S201 T206 39.5V W307E W207E 5.43V W207B W307B PL301 PL302

D235 BGA404 47.5V D234 BGA404 D233 BGA404 D232 BGA404 C233 250x60 U207 BGA8800 29.4V 30.7V D231 BGA404 C229 22x35 R269 150 R271 5K 30V ADJ R273 7.5K R272 5.1K

D221 BGA405 D220 BGA405 R276 6.8K D219 BGA405 D218 BGA405 M1 VU RED BLK

R227 8.2K Q201 BGA350 Q203 BGA348 Q204 BGA334 R222 47K R214 5pF R230 620 C212 68x25 R228 10K D210 BGA404 C213 68x25 D211 BGA415 D212 BGA415 D213 BGA415 R229 10K D214 BGA415 R236 1.6 R235 1.6 R237 100K Q205 BGA348 Q206 BGA335 R238 27K R239 27K C216 4.7x35

W306C W206C T205 C215 470x35 BLU RED R233 3.3K R232 VU CAL 5K CW R234 2.0K W203A W103A W103B VU RANGE S107 +8 +4 R121 9.1K S307 BATT CHECK R319 130K 2% W206H W306H NC W306G W206G .6V **

GRN 8.0V WHT BRN 27mV YEL C113 100pF L112 J2A RED LINE OUTPUT C114 100pF BLK J2B L113

GROUND

OUTPUT LINE MIC L110 C111 100pF OUTPUT J105 L111 C112 100pF S105

NOTES:

1. ALL CAPACITORS IN MFD AND 50 VOLTS OR MORE UNLESS OTHERWISE SPECIFIED. ELECTROLYTIC CAPACITORS SHOWN IN MFD X VOLTS.
2. ALL RESISTORS TO BE 5% 1/4 WATT, UNLESS OTHERWISE SPECIFIED.
3. THE FOLLOWING SYMBOLS DENOTE: CHASSIS GROUND; CIRCUIT BOARD GROUND; D.C. VOLTAGE; A.C. VOLTAGE
4. ALL VOLTAGES MEASURED WITH AC LINE = 120V, ALL SWITCHES IN POSITIONS SHOWN, MIC 1 INPUT LEVEL = -73 dBV THROUGH 150 OHMS AT 1 KHz. LINE OUTPUT LOADED WITH 600 OHMS. PHONES LOADED WITH 200 OHMS FROM TIP AND RING TO SLEEVE. INPUT 1, MASTER AND PHONES LEVELS SET TO MAXIMUM. DC AND AC VOLTAGES MEASURED WITH 10 MEGOHM METERS. VALUES ARE TYP. & MAY VARY ± 20%.

* ONLY WITH S302 SET TO OSC 1 ; ** FOR 0 VU READING.

5. WHEN OPERATING FROM A 210-250 VAC SOURCE, REMOVE F201 FUSE AND REPLACE WITH SUPPLIED 0.05 A TIME LAG FUSE AT F202.

MODEL M267 CIRCUIT DIAGRAM

8059-11-14